Pit and Quarry

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III : 11

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AUGUST, 1919

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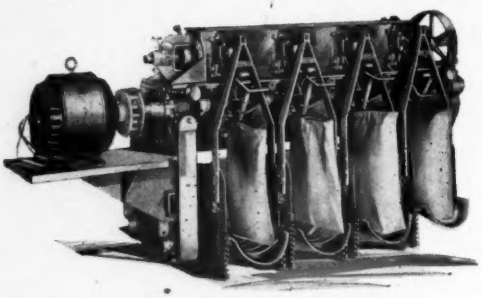
Bagging Talks

No. 6 HOW TO INSURE AGAINST LOSS OF BUSINESS



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U. S. GEOLOGICAL SURVEY
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Pit and Quarry

Vol. 3 Chicago, Ill., August, 1919 No. 11

The Man of the Hour Is the EXPERIENCED PRODUCER!

IT HAS sometimes been stated that a private corporation, using ordinary business efficiency, could take over the work of a state or municipal government, were such a thing possible, and run it with better results at about half what it costs under our present political system.

From the very nature of the case it will in all probability never be possible to try the experiment; though the theory is so plausible that there are few who will not acknowledge that there is at least some truth in the contention.

But in the face of this; in the face of the well-known fact that practically all governmental activity is prosecuted at a greater cost than private or corporate activity—numerous states and cities are objecting to the higher prices necessarily charged for pit and quarry products and are carrying on agitations for plants of their own.

PIT AND QUARRY believes that this is a mistake and will in at least most of these cases not accomplish the end desired, should the experiment be tried. PIT AND QUARRY believes, as a general principle, in the experienced commercial producer, whether the article to be produced be sand, stone, cement, food, clothing, or transportation.

The man who has specialized in any line ought to be given credit for a more accurate and serviceable knowledge on that subject than the machine politician or the ordinary man about town.

The commercial producer, who, in the face of competition sometimes unfair; of labor demands frequently unwarranted; of freight charges palpably unjust—who can in spite of these things so conduct his business as to make a little profit, is doing so only because he is putting into the quality of his product, the efficiency of his service, and the economy of his production methods, the things which he has gained from years of experience.

If this man is obliged to watch every opportunity to save the fraction of a cent a ton—and the reader knows well that under present circumstances this is the only condition on which one may remain in business—how is the publicly-owned, politically-managed, henchman-operated plant to give a satisfactory account of itself? This can only be done by the juggling of figures, the usual recouse in such a case. But this fools few, and saves no money.

This is no time to experiment. It is in a time like this that the state, the county, the city, should thank its lucky star that with all of its troubles it may at least throw the burden of providing itself with the proper raw materials of construction onto experienced shoulders. The big majority of them are satisfied to do this. But among the minority there is a socialistic unrest which itches to experiment with the people's money. Government control for war-time emergencies is to a certain extent responsible for the present

agitation, although there have of course been such experiments before. But war-time industry was not much concerned with low cost. There were other considerations which were of far greater importance. It was not in the hope of saving a few dollars on each ship that the Government extended its paternal oversight to the shipbuilding industry—*but it was to get the ships.*

No such situation exists with reference to the materials of construction. Such materials, of quality fully up to the specifications, are available in any desired quantities, and ordinarily at points more widely scattered and more economical of access than would be the case under government ownership and operation.

The commercial producer is the man of the hour. So let us fight it out along this line.

Canadian Magnesite

Dead-burned magnesite is produced by the Scottish Canadian Magnesite Co. in the plant of the Canada Cement Co. at Hull, Quebec. This work began in October, 1917, one rotary kiln being used. The initial production was 35 tons of grain magnesite per day. The demand for the product has increased to such an extent that three kilns were in operation during May, 1918, the production amounting to 100 tons per day. The magnesite as it comes from the mines in Grenville, Quebec, is mixed with 6 per cent of iron ore and the mixture is passed through a jaw crusher and ball mill and ground finely enough to pass through a 100-mesh screen. This mixture is fed to the rotary kilns, such as are ordinarily used in cement burning, and fired at a temperature approximating 2800 F. The fuel used is powdered coal which is blown into the kiln under pressure. The kilns are 60 feet long and it takes one hour for the material to travel through. The burned product is hard, dense, and granular, of a dark-brown color and about the size of fine gravel. This is the grain magnesite sold to the steel manufacturers for lining the bottoms and sides of furnaces.

Telling the Customer

There's Nothing Like Having Everything Down in Black and White

MANY producers are in the habit of stating on their stationery that "Contracts are subject to strikes, lockouts, and circumstances beyond our control," or something of that kind.

Sometimes this is printed on the letterhead so that it comes under the address and just above the body of the written letter, forming in reality a part of the communication over the signature of the writer.

The Chicago Gravel Company has expanded this customarily brief statement into an almost complete exposition of its sales policy. This is printed in small, inconspicuous type, so that it does not overbalance the letter proper. It is as follows:

All prices, agreements, and contracts made by this company for current or future delivery are made with the understanding that any internal revenue tax, war tax, shipping, placing, or other charge or tax of any kind, effective at the present time or hereafter made effective and levied by any governmental authority, on the product, on the transportation of the product, or on the contract or agreement, contract or agreement price, or any matter connected therewith, shall be added to the price named, and paid by the purchaser, and that in the event that this company is prevented from making delivery by partial or total interruption of facilities, or by fires, weather conditions, strikes or lockouts, or by any interference of civil or military authority, or for any cause beyond its control, or in the event that by reason of war conditions this company cannot deliver said product under normal freight, insurance and other costs, this company will not be obliged to make delivery. We do not guarantee the safe delivery of material, nor are we responsible for any loss by leakage, or otherwise, while the cars are in transit. Prices named F. O. B. delivery point are simply a guarantee

so far as the delivered prices are concerned and are based on the rate of freight at the time prices are made. Any advance in freight rate will increase prices proportionately: it being understood that title to the product passes to the purchaser upon its delivery to the transportation company for shipment. Unless otherwise specified, our delivered prices do not include any switching charges at the delivery point. In the absence of agreement to the contrary, all settlements are based on railroad weights of initial line nearest to point of shipment, and the terms of payment are net cash in thirty days. All bills maturing on the 20th of the month following shipment. Quotations are named for immediate shipment and subject to change or withdrawal before acceptance.

Canadian Tariff on Lime is Discriminatory

Strong Representations Must Be Made to Congress to Protect American Manufacturers

THE discriminatory tariff placed upon American lime shipped into Canada is causing considerable dissatisfaction among Pacific coast manufacturers.

The duties on these shipments are prohibitive, while the import taxes on Canadian lime shipped into this country are in comparison infinitesimal. The purpose for these high Canadian duties, of course, is to keep American lime out of Canada. The result is that most of the lime used on the Pacific coast is Canadian lime, because it can be delivered at its destination for less money than the American manufacturers can make deliveries.

Mr. Robert F. Hall, general manager of the Lime Association, in commenting on this situation, says: "The result of all this is that the Pacific coast members of the Association are practically shut down for lack of a market and that their own proper market is being absorbed by Canadian lime. These conditions call for the active attention of American lime manufacturers.

"This situation, though remote from some members of the Association, is of interest to them all, because, unless a market can be secured on the Pacific slope for the lime produced there, it will have to seek an outlet elsewhere, the effect of which movement will gradually spread eastward.

"The authority in charge of this matter in Washington is the Ways and Means Committee of the House of Representatives, and it is hoped that every lime manufacturer will write to the appropriate member of this committee calling his attention to these discriminations against an American industry and asking for speedy relief in the form of a duty on imports of Canadian lime into the United States which will at least equal the duty Canada exacts from American manufacturers.

"The executive committee has instructed the staff of the association to co-operate in every way with the persons in Washington who represent the Pacific coast interests," continued Mr. Hall, "and to appear before the Ways and Means Committee when the hearing is set and to do what it can to right this wrong."

A unanimous protest of the whole lime industry would doubtless result in arousing the members of the Ways and Means Committee to a realization of the injustice to which the lime manufacturers of this country have been subjected, and to granting them speedy relief.

The most important deposits of magnesite in the world, outside of the United States, are in Austria and Greece. The Austrian material is crystalline and in this respect it is comparable with the Stevens County, Wash., magnesite. The Grecian material is amorphous and more nearly like that of California.

Plant of Colgan Limestone Products Company, Columbus, Ohio

THE Colgan Limestone Products Company, Columbus, Ohio, has recently equipped itself for producing the best grade of agricultural limestone by installing a Jeffrey hammer pulverizer with automatic feed. The new equipment also includes elevating and conveying machinery carrying the material to a screen over one of the bins. The material is pulverized to a fineness of 40 per cent through a 100-mesh screen. Ten tons per hour are produced.

Jeffrey Pulverizer

A deposit of limestone will be opened some time this year on the main line of the C. B. & Q. R. R., west of Galesburg, in Henderson County, Ill. Plans are now being prepared for a modern plant to be erected there with capacity of 200,000 tons per month, to be ready for business by April 1, 1920.

Principles of Modern Management Applied to Quarrying

By Daniel J. Hauer.

"LEAVE it to me and I will fix it," said the foreman of the quarry. He was always using this expression, "Leave it to me," so he had been nicknamed "Leave-it-to-me Jones." Naturally much that had been left to him had never been attended to; and if so, things had been done in an expensive manner.

Modern Management Cares for Details.

Modern management leaves nothing to any man, but cares for everything. No detail is too small for the management to deal with if modern ideas are followed. "Leave-it-to-me Jones" ideas and knowledge are considered and followed so far as they may be an aid towards efficiency, but he, like other employees, from the quarry owner, general manager or superintendent down, must obey the plans mapped out, the rules laid down and the system devoved. This co-operative management considers everything, plans the operations, looks after all details and devises the record forms for keeping account of the work; draws up instructions for everything, for in doing these things the management is directing the work. When this is done they no longer direct, but become a part of the organization that must carry out these insructions, for they must obey as does the humblest laborer, and follow their own plans and rules. This takes as much ability, if not more, than does the old method of directing work.

Principles of Modern Management

During the world war we have witnessed the greatest of all modern efficiency. The Hun withstood the onslaught of four of the greatest nations of the world for about three years with remarkable success, due to the preparation that had been made for years and because of the high degree of efficiency reached through the plans made. Then came the final effort to curtail the power thus gained. The United States, with the aid of those Allies already engaged in the war, laid plans, first on paper, and then quickly made them real in construction, manufacturing, transportation and military operations, so that Germany's efficiency was mediocre as compared to our own, and she went down to defeat, not through her lands and armies being conquered, but due to the knowledge that she was contending with nations led by a nation more efficient than she.

If it is possible for several boards or commissions to plan and control the resources, industries and population of a great nation, it is certain that the same methods are applicable to a single industry, and especially to a single unit or plant of such an industry.

Quarrying is susceptible to such planning, which is the first principle of modern management.

Planning Quarry Operation.

Efficient planning is not easy. It is an undertaking that can be done by one man, but is more successfully handled by a number of men, preferably by one man with a corps of assistants.

Planning consists of many things. All guessing must be eliminated, for the plans must be made from exact knowledge and information. The various details must be noted and figures and plans must be placed upon paper. Many of the results can be memorized, but it is wrong to depend upon the memory. These things are not theoretical, for they are the result of experi-

ence, but they are based upon theory and practice.

Quarrymen are doing these things and quarry economies too are obtaining results that are astonishing operators who thought a man had to be raised in a quarry in order to understand the workings of one.

Just as it is possible to plan a military campaign in advance, it is possible to plan the operations of a quarry, not only for a season, but for many years in advance. With this general plan, and that also of handling the details, modern management is inaugurated. Objections can be made and exceptions pointed out, but in developing the plans the objections are overcome, while exceptions do not make the rule.

.The Highest Test of Management.

This planning is the highest test of management. It is not bound by precedent. It may even be revolutionary, for it must consider only one thing—*the successful operation of the quarry.*

This type of management for the quarry is superior to all others. It takes an abler man to inaugurate it and follow it up. It may mean doing away with the individual who inaugurated the system and management. It calls for the "working together" spirit that makes the success of the work dependent not on any individual, but upon the entire working force.

It means obedience for all. Yet the men are not made mere machines, for they are given an incentive to think and to improve upon old standards. It is the perfection of a system, devised by an individual, yet one which, although it takes into consideration individualism, does not depend upon the individual, not even upon him who devised it. These ideals of management based upon scientific principles are to obtain the greatest efficiency, 100 per cent, if such efficiency could be obtained.

Not only are the old standards of management considered, but there is included much that may be new to the quarryman, much that has hitherto been left to the workman, many details that have previously been considered beneath the notice of the manager. Small details and methods may have to be learned from the men, so as to include all of these features.

The principles of modern management, the highest test of management, for *The Successful Operation of the Quarry* are:

1. Planning development and operation.
2. Designing and engineering.
3. Mill operation.
4. Routing of the stone.
5. Grading and sorting the products.
6. Instructions for operating.
7. Basis for rewarding workmen.
8. Selling the products.

Each of these principles must be considered in detail while some should be divided into sub-heads.

1. Planning Development and Operation.

This feature of quarrying can be considered under the two heads here given, although each to some extent is distinct from the other; yet after the development is once started both it and the operation can be carried on simultaneously. The operation of the quarry is treated separately from that of mill operation.

As a man building a house first sits down and figures the cost, so one about to start a quarry goes over the ground and figures on a general plan of opening up and developing the ledge for economical production. No matter what kind of a quarry or pit it may be, this is done. Thus, at least a mental plan is gotten up. It is decided to make the opening at some certain point and work in some particular direction, or to work around in a circle, yet the likelihood is that nothing regarding it is set down upon paper.

Then it is decided to locate the mill at a certain place, and then to connect the mill with the ledge by means of tracks. Thus nothing is done without some kind of a plan. Yet without anything being on paper, not only does the quarryman change his plans frequently, but his employees are likely to make changes. Many times have superintendents or foremen been instructed to do things in a certain way, and either have misunderstood or have decided their own plan was better and ignored the instructions given. If written instruction accompanied by plans had been given, this would not have happened, for no excuse can be given for not following written instructions and practical working drawings.

This shows the need of plans from the start. In fact, it is advisable to do no work whatever without plans being made. It is first necessary to make a survey and plot of the ground. Upon this plan, drawn to a fair size scale, can be shown the topographical features. Yet to better understand the layout, cross sections of the ledge should also be made and these shown on the plan.

In other words, the planning of the development should be made from exact knowledge and from all the information available, and should not be based upon meager knowledge and guesswork. Thus there should be exploration made of the ledge. Drill holes driven show the character of the rock, especially if cones are taken. Drifts or small tunnels can also be driven to further explore the ledge.

With the survey and exploration made, then plans can be drawn up for the development of the ledge, deciding upon the elevation of the quarry floor or floors, whether to work the quarry in one or more than one lift, the kind of quarry plant needed and the transportation method to be used, and other features. The plan for development will not be made for a year, but possibly for a long term of years. The exploration will show the amount of overburden to be removed and the plans for developing will include the removing of this.

Costs—From such plans accurate costs can be estimated for developing the ledge, and with these known it is possible to divide the work over a term of years so as not to expend too much money on developing until some money is being earned. For many quarries are opened without havigg more than a guess at the cost of developing, so that financial difficulties are encountered. It is safe to say that such costs nearly always exceed the guesses made.

With the plans made for the development, those for operation follow. The drawings for the first will answer for the operation, but it will be necessary to set down in writing the methods to be followed, and the forces that are to be worked. This will allow an estimate to be made of the probable output of the quarry and its cost, but in this connection must be taken the work of the department of

2. Designing and Engineering.

as well as several other subjects listed under the various headings. Whether done by a different department or man, or all of these things by the same man, this designing nad engineering must follow, covering the machines working on or against the ledge, the method of handling the quarry product and its transportation to the mill, and the design and construction of the mill and the machinery in it.

In but few cases will it be necessary to design machines, for these can be purchased already built; but plant layouts must be made, and the buildings must be designed and built, as well as conveyors, elevators, chutes and bins. In the plans, consideration must be given to building and installation, operating, maintaining and repairing.

(To be continued)

How Magnesite Is Prepared for Use

Burned in Kilns Much Like Those Used for Lime or Cement

MAGNESITE in very limited quantities is used just as it is mined. For use as a refractory and in the manufacture of flooring material it has to be burned or calcined, that is, subjected to a high degree of heat in order to drive off its carbonic acid or carbon dioxide (CO_2) content. This treatment incidentally saves freight, for the gas weighs more than the magnesia or magnesite (MgO) which is left. By weight, the mineral is 47.6 per cent magnesia, and 52.4 per cent carbon dioxide gas.

Calcination is accomplished in different types of kilns as follows: (1) Bottle-shaped kilns; (2) vertical kilns resembling some lime kilns; and (3) rotary kilns like those used in the manufacture of Portland cement. Distillate or crude oil is the principal fuel used in California, but coke is also employed. The distillate is atomized with air or steam into the different compartments of the kiln and the waste heated gases serve to heat the raw or crude magnesite as it descends from the intake. The coke, where used, is mixed directly with the ore as it is fed. In general, there is good utilization of waste heat both at the feed and discharge ends of the kilns. The action is continuous or may be so if desired.

Capacities of kilns differ according to the different types and sizes. The best practice in the bottle-shaped kilns of ordinary size gives 15 to 20 tons calcines per kiln per 24 hours; in 125-foot rotary kilns, 60 to 75 tons per 24 hours, in vertical kilns, approximately 7 tons per 24 hours. Smaller rotary kilns of course produce correspondingly less quantities of calcined material.

At the very modern plant of the Northwest Magnesite Co. at Chewelah, Wash., five rotary kilns are installed and a sixth one is on the ground ready to be set up. Powdered coal is used for fuel and the capacity is 60 to 65 tons of dead-burned magnesite per kiln per 24 hours, making a total of 325 tons of calcines per day, or approximately 10,000 tons per month. When the sixth kiln is installed the capacity will be about 12,000 tons per month. At the other plants in the Stevens County, Wash., field, vertical brick kilns are on the ground; and wood which is very abundant has been used to make the preliminary calcination. These kilns probably can not burn the magnesite to the proper degree so that the American Mineral Production Co. has shipped its partly calcined material to the cement plant of the International Portland Cement Co. at Irwin, near Spokane, where it is dead-burned after mixing with iron ore, in 165-foot rotary kilns. The practice in Washington is comparable with the best foreign practice and it is judged that the capacity of the 125-foot rotary kilns employed is about the same as in Austria. Action in the rotary kilns is continuous.

In the bottle-shaped kilns only coarse lump can be calcined, not fines, the reason being that fines obstruct the draft. In the rotary kilns, all sizes may be calcined, fines as well as lump. Calcination, as at present carried on, results in two products. If the burning is carried to the point where 3 to 4 per cent carbonic acid (CO_2) is left, then the product is referred to as caustic and is sold principally to the flooring trade. Some of the California material now being produced goes into this trade. If burned

to the point where it contains approximately ½ per cent of carbonic acid gas by weight, it is referred to as dead-burned. Dead-burned magnesite in the form of brick and grain magnesite are used in open-hearth furnace bottoms and for other refractory purposes, and approximately 90 per cent of the total consumption of the United States is of this kind.

The capacity of the calcining plants of California is estimated at 350 to 400 tons daily or 10,000 to 12,000 tons monthly. In Washington, considering one plant alone, the Northwest Magnesite Co., there is a calcining capacity of 10,000 tons per month, making in all a capacity of 20,000 tons per month or 240,000 tons per year, which is far more than ample for the needs of the United States.

The different California plants for mining, handling, and calcining magnesite are built upon the same general principles. Mining is carried on by overhand stopping and backfilling to avoid caving. The ore is hauled from the mines in small cars to the bins or bunkers and may be sized there, after which it goes to the calcining plants either by aerial tramways or by gravity planes or chutes. It is then calcined, and crushed or sized, after which it is ready for the trade. In Washington, the treatment involves the addition of iron oxide to bring this constituent up to the required degree. The plants are all more or less elaborate and in most of them the investment is considerable. It is estimated that the total plant investment in California and in Washington is $3,500,000 to $4,000,000.

The number of men employed at present in California is estimated at approximately 150 to 200. On the assumption that this number is about 25 per cent of what it was during the war, the total number of men formerly employed in this industry was about 800 to 1,000. The total number of men employed during the war at the different properties in Washington was probably not far from 400 or 500. Thus, it is estimated that the industry would normally employ more than 1,000 men with 1,500 as a maximum. These figures include only men engaged in the actual producing and transporting end of the business.

The recent price for Washington calcined magnesite has been $32.50 per ton at Chewelah, Wash. Little or no California magnesite has recently come East for refractory purposes, but some has been shipped to Chicago for plastic purposes. The latter involves very careful selection and fine grinding and is put in bags. Consequently, it is much higher in price than that used for refractory purposes, and the price varies with the care exercised in preparation. Magnesite brick this spring, at Chester, Pa., were $90 per ton, or $50 per thousand, and this price is still quoted in some of the latest technical journals.

Freight rates plus war tax to Pittsburgh from California and Washington points are $14.21 per ton, and to Chester, Pa., $16.07 per ton, making the total cost per ton of grain magnesite at these points $46.71 and $48.57 respectively. The freight rate on calcined Canadian magnesite to Pittsburgh, Pa., is about $8.50, which is just about half of what it was from the Western points to that city.

In view of the removal of Government restriction on new buildings, and the brighter outlook for business generally, the Rockland and Rockport Lime Co., Rockland, Me., has announced a voluntary increase in its wage schedule. Quarrymen will receive a base wage of $3.51 for a 9 hour day, a bonus opportunity making it possible for them to earn in excess of $4.00 per day. Kiln-tenders, working on an eight hour shift, will now be paid a base wage of $3.36, the bonus arrangement bringing it up to $3.50 per day.

Original Plant before Removal and Reconstruction

Gravel Plant Moved Many Miles

By F. M. Welch

ONE of the largest and most modern plants of The Greenville Gravel Company was dismantled and moved during the past winter, and has been reinstalled with additions and extensions, at another pit.

The plant, which is of steel construction, was designed and built three years ago with the idea in mind of ultimately dismantling and reassembling it. Considering the size of the plant, which produces 75 cars of washed, screened and crushed material in ten hours, the anticipation of such a move at the end of a short period was somewhat discouraging.

Both the site from which the plant was moved and the site to which it was moved, were rich in mineral deposits; and although the first deposit was known to contain but two or three years' operating opportunity, yet the market opportunities were so excellent as to be sufficient incentive to locate the plant there even though temporarily; besides this, the second site was so conveniently located in relation to the first one as to make the removal of the plant practicable. The move was very successful, consuming but very little of either the 1918 or 1919 operating season.

The original location was near Riverside, a station on the Big Four Railroad, three or four miles down stream from the heart of Cincinnati. The new location is near Cleves, Ohio, seventeen miles in the same direction from the "Gateway to the South," and on the same railroad.

At this last location there is a valuable and extensive bank of material where the plant can operate a great many years without interruption.

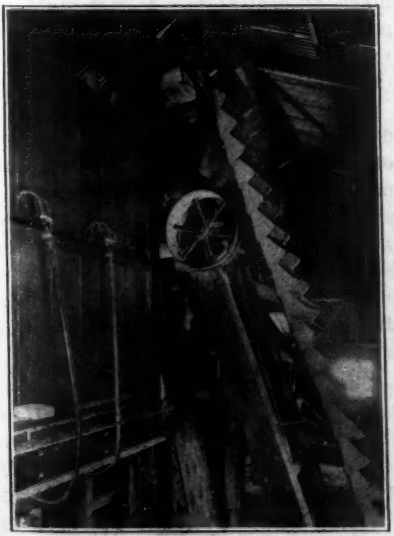
Before moving to the new site, the value of large storage had been demonstrated, and as the Riverside plant was not one of this type, the problem of converting the original plant into one with large bins confronted the company. The unique transformation was accomplished by installing the bins first, then by reerecting the old steel structure, with most of its machinery on top of the bins.

The bins, which have a storage ca-

pacity of about 80 cars of material, are of cribbed construction, set on concrete walls, similar to those at the Richmond plant of the same company. The walls are 14 feet high above the loading tracks, which is the usual clearance allowed under bins for loading railroad cars. The entire storage is divided into eight bins, into each of which any of the grades of material produced can be spouted by gravity. Three sliding gates in the bottom of each bin permit the loading of cars. Two loading tracks run under the bins and one alongside.

All of the screens and other plant machinery were left in their original relative locations to the main building. The bins extend under the entire plant proper. and several feet beyond, both east and west. They do not extend under the crusher room, which is an annex to the main structure. This arrangement permits solid concrete foundations to extend from the ground to the crusher bases.

The waste water, containing fine sand and loam, is sluiced to a portion of the pit which has already been ex-

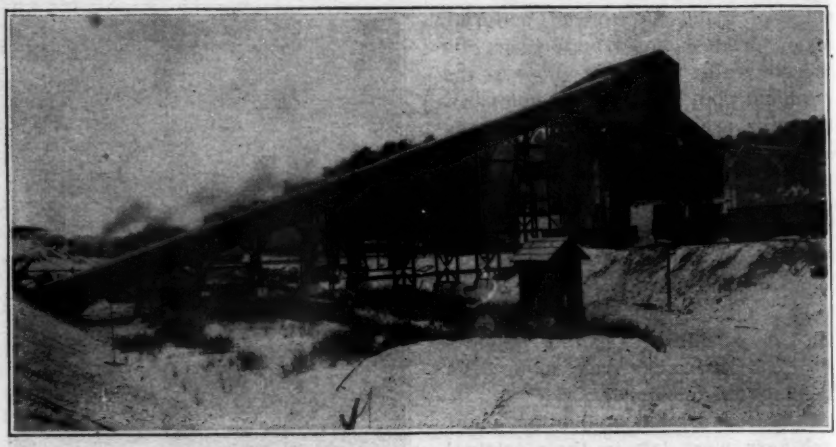


Up to the Screens

Conveyor Gallery

cavated by the Big Four Railroad. The track lay-out for both empty and loaded cars is ideal for rapid loading and moving. Two full trains can be accommodated at one time if necessary.

The plant is served from a large track hopper, where trains of dump cars bring raw material from the steam shovels, by a steel apron feeder and a 36-inch belt conveyor 220 feet long. This conveyor delivers sand, gravel and boulders to a 60-inch diameter revolving gravel screen 16 feet long. The screen is equipped with two outer jackets, one for producing small gravel, and the other for sand. Two grades of coarser gravel are produced by the main screen barrel which rejects all oversize material into a spout, which takes it by gravity to a No. 5 Gates gyratory crusher. The largest grade



The Plant is of the Best Construction

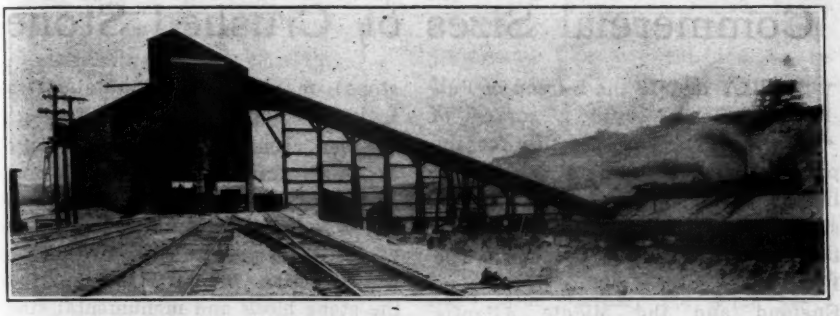
of gravel produced can be spouted to any of the bins, or by means of fly-valves, deflected to either a 36-inch Symons Disc Crusher or a No. 37 Kennedy-Van Saun Gearless Crusher. The sand, which passes through the outer jacket of the gravel screen, together with the washing water, passes through a sluice-way to a large settling tank, where the clean sand settles and is drawn off through valves near the bottom of the tank and the water with the impurities rises to the top and overflows to the waste pipe. The various sizes of gravel produced, together with the sand, can be spouted by gravity to any of the storage bins, either separately or in any desired mixture.

The stones and boulders which pass to the crusher room, are reduced to marketable sizes of crushed rock and spouted from the crushers into a large continuous bucket elevator, 50 feet high. This elevator discharges all the crushed material into a 48-inch diameter stone screen, which is also equipped with two jackets and is capable of separating the crushed rock into any number of grades or mixtures of crushed rock. The rejections from this screen return again by gravity to either of the smaller crushers, from which they are re-elevated and rescreened.

Both revolving screens are of the double trunnion type. The trunnion rings are fitted with 4x1¼-inch steel tires, shrunk on and machined after shrinking. They are about 6 feet in diameter. The trunnion wheels are practically duplications of railroad car wheels in shape and size, and are made of cast steel. A cast steel annular spur gear is attached around the feed end of each screen by which the screens are driven.

Each unit in the screening plant is driven by a separate motor, thereby eliminating a myriad of power transmission machinery and also enabling any unit to be stopped or started without interfering with the operation of the balance of the plant. In the crusher room a 100 H. P. motor drives a line shaft, from which all the crushers are propelled.

The washing water, which is pumped to the top of the plant from the company's own reservoir [illegible] by, is introduced to the [illegible] by means of 6 inch pipes passing lengthwise throughout both revolving screens. Through two rows of or-



This Shows Adequate Railroad Connections

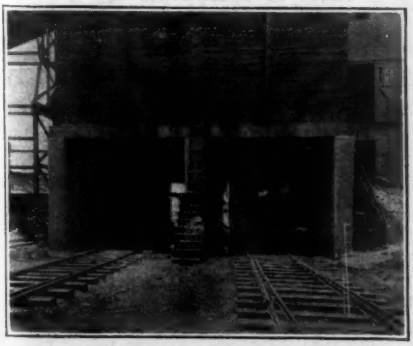
ifices placed a few inches apart along these pipes, the water is jetted onto the sand, gravel and crushed stone, during the entire screening process. These orifices are so constructed that they can be checked or opened at various points, which insures maximum washing, rinsing and rerinsing at the most advantageous points in the process.

After the material reaches the various bins or compartments of the enormous storage, it is loaded directly into gondola cars passing underneath, through sliding gates. Trimming platforms, attached to the bin supporting walls extend along each loading track throughout the length of the storage, from which the gate levers are operated. From these platforms inspectors keep careful watch of the quality of all material as it is loaded.

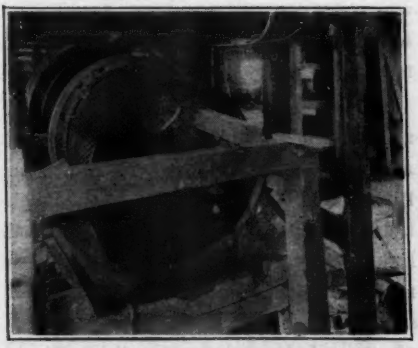
The track facilities are ample for the spotting, loading and pulling of several trains per day.

This plant, in its new location and with its extensive added facilities is one more evidence of the progressive and far-reaching policies of The Greenville Gravel Company and its President and General Manager, F. D. Coppock.

Davenport locomotives and Marion steam shovels are used. The engineering and designing involved in the transformation of the original plant to one of large storage capacity, was handled by the Greenville Manufacturing Company of Greenville, Ohio. All new equipment and repairs were furnished by the same concern.



Under the Bins



One of the Screens

Commercial Sizes of Crushed Stone

EARLY in 1917 the Bureau of Public Roads began a survey of crushing plant practice for the purpose of securing data to be used in the development of a system of standard sizes and uniform nomenclature of crushed stone products. The 1917 survey covered plants in the New England and the Middle Atlantic States. During the summer of 1918 this work was extended to the states of Ohio, Kentucky, Tennessee, North Carolina and Georgia. The results of the 1918 survey are described by Mr. F. H. Jackson, and Mr. C. W. Mitman, in Public Roads.

Of the 65 stone crushing plants inspected in the last field season, 34 are located in the western half of the state of Ohio and extend from the edge of Lake Erie southward to the Ohio River. The rock quarried throughout the state is a dolomitic limestone, occurring in perfectly horizontal beds varying in thickness from 3 in. to 5 and 6 ft. and lying within 6 in. to 2 ft. of the surface. Six plants were visited in Kentucky. All of the plants crush limestone of the same character as that found in Ohio. Five plants were visited in Tennessee. The rock crushed is a limestone of good quality when it can be obtained free from bands of shale or "rotten rock" as it is called locally.

Six plants were visited in Georgia, all located within a 50-mile zone of Atlanta. Three of these crushed granite as a by-product to the stone-block industry. Two crushed a bastard limestone and one a granite gneiss rock. All the plants visited have a small output and (with the exception of one of the plants crushing limestone), make crushed stone almost an incidental industry.

Seven crushing plants were visited in North Carolina, distributed north and south of an imaginary line extending from Asheville to Raleigh. All the plants crush granite rock, two making the crushing industry incidental to the stone block and monumental stone industry.

The most important element in the equipment of a crushing plant, in so far as quality of grading is concerned, is the screen. Screening methods therefore were given first consideration in the study of each plant. The data collected included the length over all, diameter, pitch, and speed of revolution of each screen, the number of screens in operation, and the length and diameter of each section of screen. If gravity or pulsating screens were used, their dimension, pitch, and size or holes in each compartment was obtained; the nominal diameter (or dimensions, if square holes) of each section of the screen at the time of inspection was recorded, together with the total length of each section having the same size holes. In addition, information was obtained pertaining to crushing and elevating machinery such as would present a complete flow sheet of operations.

The general condition and operation of the plant as a whole was noted and recorded. A record was made of each commercial size of crushed stone produced, including the name under which each size is sold, and the limits in size within which each grade is supposed to lie.

Finally, a sample of each commercial grade, available at the time of inspection, was obtained, and a mechanical analysis of each sample was made on the spot. Samples of grades

smaller than ¼ in. were mailed to Washington for mechanical analysis.

Screening Methods In Use

All the plants visited are equipped with revolving screens, but a few in Ohio have in addition pulsating screens installed in various stages of the operation. Revolving screens, in the majority of cases, are used to obtain the larger sized products, while the smaller grades are obtained with the pulsating screens.

In its simplest form the pulsating screen consists of two or three rectangular frames constructed of wood and hung one beneath the other, each frame having a perforated metal or woven-wire screen attached to the under side. The three frames are in turn hung in frame work and rocked to and fro by means of eccentrics. If a three-tier screen is used the upper has the largest perforations and the lowest the finest. All grades discharge from the screen, opposite to the feeding end. These screens may be set either in a horizontal position or may be inclined, combining, in the latter case, the principles of the gravity screen and pulsating screen.

An analysis of the results of the mechanical analyses leads, in general, to the same conclusions as were noted in the 1917 survey. Thus, variations in pitch and speed of revolving screens, contrary to the general idea, appear to affect the grading very little. Likewise, it may be noted that, except in a very general way, the dimensions of the screens themselves have little influence on the sizes of the products. This, of course, does not mean that, in any individual case, the diameter, pitch, or speed of the screen does not influence the grading of the material produced. It does seem to indicate, however, that there are other influences at work which overshadow the effect of these variables.

The rate of feeding the stone into the screen, which, of course, varies continually during the screening operation and therefore can not be recorded, probably influences the grading to a marked degree.

Standard Requirements in Ohio

In Ohio, practically all the operators are producing stone nominally in accordance with the state requirements for size. These requirements have been standard for some years, and, inasmuch as limestone is quarried throughout the state under practically the same conditions, it would seem that to produce these sizes revolving screens of the same diameter of perforations should be used in the various plants. As a matter of fact, this is far from true. For instance, of the 12 plants in the state producing the Ohio No. 1 standard size limestone (2½—3½ in. or 2½—4 in.), or its equivalent, by means of revolving screens, one plant has 2-in. holes in its screen retaining the product, two plants have 2¼-in. holes, six have 2½-in. holes, two have 2¾-in. holes and one has 3-in. holes. Likewise, in the case of the No. 2 Ohio standard size (2½—1½ in.), in the 11 plants producing this material the same relative variations in size of perforation may be noted. Thus in a state where standard sizes for broken stone used in rado construction have been in use for a number of years, revolving screens with 13 different sizes of holes are used to produce three grades of stone.

For the purpose of making comparisons between the nominal and actual sizes of product, Table I was prepared.

It is interesting to note that the average efficiency of screening operations is somewhat greater among the plants visited in 1918 than among those in New England and the Middle Atlantic States. As recorded in the original report, 34 per cent of all

the plants visited in 1917 produced the ordinary commercial sizes with less than 5 per cent variations from the nominal size of perforations in their retaining screens. Table I shows that 37 per cent of the plants visited in 1918 produced stone within this limit of variation. Again, whereas approximately one-half of all the plants inspected in 1917 showed less than 10 per cent variation from the nominal sizes, 62 per cent of the operations studied in 1918 were equally as efficient. This latter average is raised considerably by reason of the very efficient grading observed in the states of North Carolina and Georgia. The average results for the state of Ohio are practically the same as were obtained during 1917.

TABLE I.—EFFICIENCY OF PLANT SCREENING.

State.	Number of plants.	Approximate size of product	Proportion of plants showing the following variations from nominal size. Less than 5 per cent.	Less than 10 per cent.	Less than 15 per cent.	Over 15 per cent.
Ohio	15	4 to 2½ in.	34	68	74	26
	19	2½ to 1¼ in.	16	42	63	37
	16	1¼ to ¾ in.	31	50	63	37
	22	¾ to ¼ in.	50	68	73	27
	72	Average	33	57	68	32
Georgia	3	2 to 1¼ in.	67	100	100	..
	4	1¼ to ¾ in.	25	75	75	25
	6	¾ to ¼ in.	67	67	67	33
	13	Average	54	77	77	23
North Carolina	7	2½ to 1¼ in.	43	57	79	21
	7	1¼ to ¾ in.	43	71	100	0
	4	¾ to ¼ in.	25	100	100	0
	18	Average	39	72	92	8
	103	General av.	37	62	73	27

TABLE II.—ACTUAL SIZES OF PRODUCTS OF OHIO PLANTS.

Plant No.	Known as—	Per cent over 3 in.	Mechanical analysis—Per cent between 3 and 2½ in.	2¼ and 2 in.	2 and 1½ in.	1½ and 1 in.	1 and ¾ in.	¾ and ½ in.	½ and ¼ in.	Per cent under ¼ in.
5	..	40	28	32	..	..	..	..	..	..
9	..	52	36	12	..	..	..	..	..	..
10	..	18	82	..	..	..	..	..	..	..
11	..	73	23	4	..	..	..	..	..	..
12	1	34	30	30	6	..	..	..	..	..
13	..	36	40	24	..	..	..	..	..	..
18	..	..	12	5	..	..	..	..	..	..
20	..	..	..	9	..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..
5	..	..	..	38	56	6	..	..	..	..
9	..	..	6	91	3	..	..	..	..	..
10	..	..	12	47	40	1	..	..	..	..
12	..	..	..	47	33	19	1	..	..	..
13	2	..	11	60	29	..	..	..	..	..
18	..	..	..	36	47	12	5	..	..	..
20	..	..	5	34	37	24	..	..	..	..
21	..	..	36	47	12	5	..	..	..	..
23	..	..	..	..	60	40	..	..	..	..
5	..	..	..	..	30	61	9	..	..	..
9	..	..	..	..	46	53	1	..	..	..
10	..	..	..	..	17	52	27	4	..	..
12	3	..	..	..	12	52	27	9	..	..
13	..	..	..	..	1	49	32	18	..	..
20	..	..	..	..	2	80	16	2	..	..
21	..	..	..	..	..	2	83	15	..	..
9	..	..	..	..	..	16	20	34	26	4
10	..	..	..	..	..	..	5	28	63	4
11	..	..	..	..	..	..	11	82	7	..
12	4	..	..	..	..	..	..	36	40	24
13	..	..	..	..	..	..	10	47	43	..
18	..	..	..	..	..	54	18	21	7	..
20	..	..	..	..	..	..	33	60	7	..
21	..	..	..	..	..	42	27	18	13	..
29	..	..	..	..	..	..	6	67	15	12

The reason for analyzing the data obtained in this manner is to secure figures based on actual screening operations, which might be used in framing practical specifications for stone sizes. The average specification covering the size of crushed stone products is purely theoretical. It usually requires stone graded between certain fixed limits withou tany allowance for imperfect screening. It is the custom, therefore, of most operators to use screens

with openings slightly larger than those specified, so as to obtain approximately the sizes desired. This custom results in the production of more or less indefinitely graded products, which sometimes do, but much more frequently do not, meet the letter of the specification.

With the exception of the state of Ohio, there is practically no uniformity in the nomenclature used in designating crushed-stone products. The state of Ohio has, for some years, used a standard system of stone sizes, each size being designated by a number. The majority of the crushing plants in Ohio which were visited use the state system of numbers in designating their product. This is about as far, however, as the uniformity extends, because even the operators who use the same nomenclature do not always use the same screens for obtaining nominally the same product, nor do the products themselves have always the same grading. This latter point is brought out in Table II, in which the actual sizes of crushed-stone products sold by plants using the state nomenclature are compared.

That portion of the mechanical analysis included between the vertical lines in each subdivision gives the proportion of the total product which meets the state requirements for size. Some extremely wide variations from the state requirements are shown. The general tendency is to produce larger stone than that specified. This table shows that just 3 out of the 35 products indicated meet the requirements.

One point in connection with the standardization of stone sizes which has not been discussed is the effect of character of stone on the maximum size allowable in various types of construction. It is recognized, for instance, that the sizes should be somewhat larger in the case of limestone than where granite or trap is used.

Rates Held Unjust in Kickapoo Case

Examiner Suggests Reforms to Equalize Charges in the Chicago Territory

IN a tentative report in the case of the Kickapoo Sand & Gravel Co. vs. A., T. & S. F. et al., Attorney-Examiner Charles F. Gerry recommends that the Interstate Commerce Commission hold that rates on sand and gravel from Kickapoo, Ind., to Chicago and points in the Chicago switching district are relatively unjust, unreasonable and unduly prejudicial, and that reparation be awarded.

A further recommendation is that the Commission order the carriers to establish rates from Kickapoo to Chicago no higher than rates from Ginger Hill to Chicago. He also recommends that rates from Kickapoo and Ginger Hill be made somewhat higher because more distant than the rates from the inner zone and that a fair measure of this difference would be the now existing differential between the outer and inner zone—namely, five cents per ton over the rates contemporaneously applicable from the inner zone to Chicago and points in the Chicago switching district.

Further, he says, the unreasonable and unjust practices by which the carriers construct their joint rates to points in the Chicago switching district by the use of different rate bases and charges for substantially the same service performed in switching cars from the line-haul carrier to industries and team tracks on the Belt or connecting lines, should be reremoved by the application of a uniform charge for substantially the same service to all shippers alike, irrespective of the point of origin of the traffic.

The SHOT

A Little Story of the Quarryman's Life

By FRANK A. HALVERSON

Dynamite Demonstrator of the Hercules Powder Co., Pittsburgh.

IN the tunnel amid the noise of the jack drills whose tap, tap, struck giant blows in the hard limestone, came unexpectedly "Super" Bob and Muriel Forsythe. Bob's delight was evident as he explained the various angles of construction work to Muriel.

"There," explained the drillman, shutting off the compressed air valve of the jack hammer, "that's my last hole for the day."

"All right," said "Super" Bob, "go home; I'll shoot this round. I want to show Miss Muriel how it's done."

The drillman, a big strapping American, reared in the hard school of the rock-men's creed, grinned a bit saying, "Give 'em lots of powder and the lady will think that chained lightning has broken loose."

With that he stalked back to this drill and pulled it out of the choked hole with a splendid burst of strength. A cloud of white dust arose in the narrow tunnel enveloping Bob and Muriel in a powdery mist as the former laid out the gelatin dynamite ready for loading the waiting holes.

Muriel watched the drillman's lamp gradually disappearing in the murkiness of the tunnel. She was now alone with Bob and instinctively edged closer to the man that she had accompanied into the dark dungeon. When she saw Bob picking up a sharp iron plunger and sticking it through the end of the dynamite stick, her low cry of fright came like a child's whimper in the night.

"Please be careful; it might explode," cautioned Muriel.

Bob looked up at her white face smilingly. In his laughing eyes she read the spirit of confidence that she had in his ability But Bob was unwrapping an electric blasting cap. He was just in the act of inserting it in the dynamite cartridge when a sharp blast of raging wind came through the tunnel, extinguishing the carbide light. They were tossed like grains of dust against the limestone front by the violent unknown force, but Bob's body shielded Muriel protectingly. Quickly groping their way in the darkness, they crawled into an incut cavity that had been blown out by the last series of v-shots. There they waited uninjured, waited for the thunderous crash that would be coming—whether from an explosion of some kind, or the caving in of the tunnel. Soundless, for the briefest instant Bob whispered assurance until the mighty shock broke when the seemingly maddened mountain shook itself in impotent rage because the steel of men had bit into its vitals and now in a herculean death shudder it was trying to blot out the wound in its heart. The air, traveling faster than sound, had been forced into the tunnel, unable to get out by the oncrushing tons of

stones and dirt which had broken down the timber supports of the outside tunnel, now came crashingly. Bob and Muriel crept deeper into the crevice for safety.

"Hurt?" asked Bob breathlessly.

"No, are you?" timidly from Muriel.

"Not a bit," said Bob relieved as he rose to his knees listening.

Shut in! Entombed! Buried in the heart of the mountain!

Then in the thick darkness a flare shone out brightly. Bob had found his matches.

"What's happened?" asked Muriel, dazed.

"The tunnel's caved in," answered Bob.

"We're prisoners in the heart of the mountain. We're in a world of our own, Muriel. The old mountain has cut off our way of retreat, but we're still living. We have a fighting chance."

"Good " said Muriel heartily, with true pluck.

"What a nervy girl " thought Bob admiringly. "A good thoroughbred pal, all right. She's mine if we ever get out."

"Do you hear anything?" asked Bob, his voice low and hushed.

Muriel listened closely, catching a tap—tap—tap like a faint click of a telegrapher's instrument. There was a long pause, then the tap—tap—tap came again.

"It's the signal," remarked Bob, "and it's being sent on the air-pipe."

After a while three more taps came out of the darkness.

Bob scrambled to his feet. Someone was signalling, perhaps caught under the edge of the cave, pinned fast, hurt and helpless.

"I'm going to see," said Bob, taking the lamp. "Will you be afraid to wait alone?"

"No," but Muriel's voice trembled just a little.

Bob drew away as another tap—tap—tap spoke its enigmatic message.

The cave blocked his way.

The dark arrow of despair entered Bob's thoughts for a moment when he saw how hopelessly they were trapped. It would never do to let Muriel know that he was giving up. He, the man, giving up while the girl waited bravely back in the dark shadows! Never!

Picking his way carefully, Bob scrambled down between the caved rocks from his fruitless tour of reconnoitering. He was whistling. Muriel would hear him and cheer up, he thought, as he whistled the louder.

Stopping for a low breath, Bob's ears caught the faint tap on the metal air-pipe again. He had momentarily forgotten it in his haste to find a way out. Groping ahead his hand touched something soft and a weak voice spoke from under the pipe.

"That you, Bob?"

Bob recognized the voice. It was the big American drillman.

"Hurt?" asked Bob.

"A little. My foot's fast."

Bob winced. The driller had been thrown under the pipe and it had saved his life in holding the big stones off his body. He had been signalling by tapping on the pipe with a small stone.

"Here," said Bob, shoving a stone under the driller's armpit to keep his head up, "rest your weight on this until I get your foot loose."

Under the pipe Bob found that the large stone was weighted mostly on the sole of the driller's boot, gripping him tightly like the jaws of a pincer. In short order Bob's knife slit the leather. With a steady pull the driller freed himself. Out they crawled to where Muriel was waiting in the darkness.

"Mercy," she exclaimed, "I thought you had gone. Can we get out?"

"Sure," replied Bob, optimistically.

The driller looked at him sharply. Of course, Bob knew that the chance of escaping was hopelessly improbable. With tons and tons of rock barricad-

ing their passage, how could they reach the outside world again?

Then, in the semi-darkness, Bob noticed that the air was becoming foul. Marsh gas with its deadly work was noticeable in a sleepy stupor that was creeping over them. Air! Air!

"Stay close," admonished Bob taking the lamp. "I'm going to look around a bit," and he walked into the darkness.

Hardly had he gone before a low grinding sound jarred the dark stillness. As it died away, an agonizing moan reached Muriel's ears.

"What's that?"

"Bob's caught," groaned Harmon, "and I can't move to help him."

Muriel rose quickly. The light from Bob's lamp gleamed ahead. Toward it she stumbled. When near, she saw Bob lying face down with a large slab of slate resting on his body.

"Bob! Bob!" she cried wildly.

"There, there!" he soothed, raising his head, "I'm all right. The slate slid unexpectedly and caught me. My foot's crushed."

Filled with a wild fear and endowed with a hidden reserve strength, Muriel gripped the stone and Bob feeling the dead pressure eased a bit, struggled free.

"What a girl you are!" he exclaimed.

"Lean on me," commanded Muriel, as she partly carried Bob to the face of the tunnel where Harmon waited with fear-filmed eyes.

"Muriel," said Bob, "you're in charge. Harmon and I are done for. You're the superintendent of excavating us out."

"Listen," began Bob, "do you think you could shoot the dynamite? There's three hundred pounds for the holes. Can you carry it up over the cave? Perhaps the blast will knock a hole through the top to the outside."

"Anything," agreed Muriel.

It took a long time for Muriel to carry the six fifty-pound boxes of explosives to the edge of the cave while

Prisoners in the Heart of the Mountain

Bob and Harmon looked on, unable to help.

"Fine!" encouraged Bob as he assisted in opening the dynamite cases.

"Now the connecting wire," suggested Bob at the same time unraveling the leading cable and wrapping the loose end of it around an armful of dynamite cartridges. With the blasting wire and dynamite on her shoulder, Muriel began climbing up over the perilous stones, pulling the cable of copper wire and dynamite higher and higher as she struggled upward, getting farther and farther away from the bottom, until at length she reached the top of the cave. Here she told Bob that there was an oblong roomy space. A flat rock sagging away from the top ledges gave her the opening that Bob instructed that the dynamite charge should be placed. Worming herself into the pocket's deepest end, Muriel filled the spongy gelatin cartridges like kindling wood tightly against the top and bottom of the cavity. In the fifth stick she inserted an electric cap as Bob told her to do, then more dynamite until the supply which she had brought up was gone. Letting down the end of the cable, Bob knotted another armful on it and she pulled it up until the

pocket was filled to the notch. Connecting the copper wire to the electric caps, Muriel slid down to where Bob and Harmon were lying on the floor of the tunnel.

"All ready?" asked Muriel quietly.

"Yes," responded Bob, his face haggard and deadly pale in the glimmering shadows of the fast dying flame of the lamp. There was not enough air for the fire to burn. Death was advancing—

"My splendid girl," muttered Bob reeling from the effect of the impure air. Uncoiling the blasting wire, Bob had her lead it to the battery at the front of the tunnel where Harmon was panting for breath. Muriel attached the two copper wires to the firing battery and drew up the plunger. The shot for their lives was about to be pulled. Would the liberation of the powerful chemical burst a hole through to the outside world and make an avenue of escape from the strangling gas-filled air? Or was there too much cover for the charge to life? How much had crashed down? How close was the dynamite to the surface?

"Pull it, Muriel, pull it," pleaded Bob

Muriel Watched the Drillman's Lamp Disappearing in the Murkiness of the Tunnel

standing on his knees in a pool of water.

With both hands on the battery plunger, Muriel shoved down with all her strength. The electric spark sped through the copper wire caps and instantaneously the dynamite spoke in the voice of thunder. A shower of dust and fumes swept inward, the cavity roared with the voice of the deafening charge. The mountain swayed, the foul air pulsated back and forth and the sound gradually died into a hollow echo.

At length Muriel arose. The tunnel was full of dynamite fumes. Without a word she crawled toward the edge of the cave. The men were sleeping, overcome. If the dynamite had failed, it would be better for them to remain undisturbed.

A draft of air, sweet and pure, came over the edge of the cave. Muriel breathed deeply. Away above her dark abode Muriel could see a patch of the blue sky. She tried to cry out her joy at the knowledge that the dynamite had gone through, but her voice was almost gone. Turning, she began crawling back but her head sank lower; and when Muriel again opened her eyes it was to find herself lying in the Emergency Hospital of the Allegheny Construction Company. The warm sunshine was seeping through the window and the soft breeze that rustled the curtains touched Muriel's pale cheek in a playful caress. By her side stood another cot. Muriel turned ever so slightly for a better look, then her lips opened—

"Bob!"

His dark eyes were upon her and his hand reached across the intervening space as he said, "Muriel, your shot brought us both back to life. Will you share it with me?"

She smiled and in that smile "Super" Bob read his answer of acceptance.

Pit and Quarry

Rand-McNally Bldg., Chicago, Ill.
Published Monthly

HARRY W. BAUMGARTNER
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V. E. LARSEN, Manager

E. S. HANSON, Editor
D. J. HAUER, Associate Editor

Bonus System

THERE are things to be said both for and against a bonus system of payment to employes.

Last winter a member of this editorial staff met an official of an eastern crushed stone company who was very enthusiastic over the bonus system which his company had worked out. Since that time we have been in correspondence with him regarding this matter, inviting him to tell the readers of PIT AND QUARRY something about the plan on which his company is operating.

It appears, however, that either because of abnormal conditions and the present labor situation, or for some other reason, the plan is not operating as successfully as it gave promise in the beginning. Under date of July 3 this official states:

I gave a great deal of time and thought to working out a bonus system for our employees that seemed very fair to them and one which should be advantageous to the company. When I spoke of this matter I was rather enthusiastic about it. Since that time, it has not worked out as well as expected and we have practically abandoned any system of this kind and are paying the wages prevailing in the vicinity of our various plants. I am very sorry the laboring situation is such at the present time, that workmen do not appreciate any system of sharing in the results of their efforts.

Getting Ready for Car Shortage

ONE of the large lime manufacturers is encouraging his customers to prepare for the impending car shortage, by sending them a letter which embodies the following statements:

The largest wheat crop ever produced will have to be moved in box cars, very shortly. There has been no increase in box car equipment by the railroads for the past few years. Do you know what this combination of conditions means? We believe it will be worse than when the Priority Board stopped shipment of non-essentials. During the next several weeks or months, there will be considerable delays in getting box cars for lime. Anticipate the certain car shortage by placing your lime orders as far ahead as possible.

On account of the above conditions, we will make extended terms of payment, if desired.

In this connection it is advisable to state that the Car Service Section of the U. S. Railroad Administration is also urging the necessity for serious consderation of the best possible use of available equipment, having addressed the following communication to various producers:

As you know the carriers will soon be called upon to move the largest wheat crop in the hostory of the country—about 1,236,000,000 bushels, an increase of about 336,000,000 bushels over last season. The estimated rye crop indicates an increase of 19,000,000 bushels over last year and while estimates are not out on other grains, indications are that they will show a similar increase. With this enormous crop to move, it is imperative that equipment be conserved to the utmost in order that no industry shall suffer for want of cars.

Light loading is wasteful and anything that is wasteful in transportation tends finally to higher charges; on the other hand, if intensive loading is practiced, the desired results will be obtained and the railroads of the country will be able to move the commerce promptly.

Kansas Tries to Oust Cement Companies

Attorney General Begins Action Against Seven Concerns to Bar Them from State

RICHARD J. HOPKINS, attorney general of Kansas, has filed suit in the supreme court for an ouster against every manufacturing cement company in Kansas.

The suit is directed against the Ash Grove Lime and Portland Cement Company, of Chanute; the Bonner Portland Cement Company, of Bonner Springs; the Fredonia Portland Cement Company, of Fredonia; the Great Western Portland Cement Company, of Mildred; the Lehigh Portland Cement Company, of Iola; the Monarch Cement Company, of Humboldt; the Western States Portland Cement Company, of Independence.

The petition alleges that all the above named defendats have formed a trust contrary to the laws of the state of Kansas for the purpose of creating and carrying out restrictions in restraint of trade in the sale and distribution of cement in Kansas.

The attorney general charges that all of the above named companies have entered into a secret agreement, either written or verbal, to sell cement in the state at one uniform price and to add to this price and charge to the purchaser of cement an amount equal to the railroad freight charges, not from the point of production to the point of delivery, but from the city of Iola to the place of delivery. He also charges that the cement companies, in violation of the laws of Kansas, have "intentionally and for the purpose of destroying competition," discriminated between the different sections by selling at a lower rate in one section than it charges for the same cement in other sections, after equaling the distance from the point of production and the points of delivery.

The petition of the attorney general charges further that the cement companies have agreed to divide the territory of the state so that in certain portions of the state certain companies have the exclusive right to fix the price of cement, below which no other company shall sell cement.

Another count against the companies is that they have pooled their interests as manufacturers and sellers of cement so that the price is maintained at a figure excessively and unreasonably high, to the great detriment of the people of the state, and by such pooling have agreed upon a division of their receipts from the manufacture and sale of cement.

The petitions ask that each of the companies named as being members of the trust be ousted from doing business in Kansas and that the franchises he forfeited and surrendered and that all of them be excluded from the exercise within this state of any business and that all corporate acts, franchises and privileges be taken from them and that they be especially restrained from carrying out and continuing to maintain the trust and combination with which he charges them.

The hardest blow of all, to the cement companies, which the attorney general asks, is that a receiver be appointed by the supreme court to take charge and control, under the jurisdiction of the court, all the property of all of the companies in the combine, and further asks that a penalty of not less than $100 a day be imposed upon each company for every day that they have violated or continue to violate the anti-trust laws of Kansas.

The installation of new machinery in the Cuban Portland Cement Company plant is progressing rapidly, and starting with July the plant will run at full capacity.

ASSOCIATION ACTIVITIES

Wisconsin Adopts Slogan

Mineral Aggregate Association of That State Says Material Must be Screened and Clean

STATIONERY of the Wisconsin Mineral Aggregate Association now carries the slogan, "It must be Screened and Clean."

This has just recently appeared, and shows that this association is actively at work and carrying on a worthy propaganda in the interests of good materials.

It means that the association is out after the little side-of-the-road pit, which has no competent equipment for washing and grading its output.

Milwaukee county had some mighty unpleasant experiences with pit-run gravel in the early days of its excursion into the building of concrete roads, and no part of the country knows better the fallacy of the pit-run idea for concrete, or any other use which requires care.

Lime Association Adds Man to "Ag" Bureau

Sidney P. Armsby Has Been Right on the Soil, as well as in Chemical Warfare

A WELCOME addition to the staff of the Agricultural Bureau of the Lime Association is the recent appointment of Sidney P. Armsby, son of Dr. H. P. Armsby, director of the National Institute of Animal Nutrition at the Pennsylvania State College.

Mr. Armsby graduated in chemistry from the latter institution some years ago, and since then has had a varied experience in routine chemical lines with agricultural and metal industries, including administrative work.

Latterly he was in the army in charge of the construction and maintenance of chemical manufacturing plants for the Chemical Warfare Section.

Mr. Armsby will engage in field work in Virginia, North and South Carolina, the member producers of these states having co-operated financially in his appointment.

Good Business in Illinois, Says Stone

Cars Must Be Filled to Capacity in Order to Make Shortage Light as Possible

"REPORTS indicate considerable improvement throughout the state north of a line that may be drawn east and west through Centralia," says Ben Stone of the Illinois Sand and Gravel Producers Association.

"Construction work has been somewhat slower getting started in the regions south of such a line, but indications are that there will be some nice business, down there by the end of harvest. Road contracts are being awarded more promptly after bids are in and a great deal of construction work is already under way.

"Production is the real problem now at a number of plants and it will not be at all surprising to see a greatly increased demand by the first of August. It is earnestly hoped producers will not minimize seriousness of the prospective car shortage and

will awaken customers, particularly the dealers throughout the state, to the importance of stocking their season's requirements now.

"Contractors also should be urged to install storage facilities wherever possible, car order should not be limited as to number of tons or size of car, and under no circumstances should a car be loaded with less weight than 10 per cent over its rated carrying capacity."

This Association Needs First Aid

Members Are Too Busy Trying to Fight Their Battles Single Handed

SOME association members are trying to fight their battles alone. The secretary of a state association recently wrote to PIT AND QUARRY the letter given below. It would not be fair, of course to say where this came from, for the state in question has some live, energetic producers, including the secretary himself, and they will eventually work out a fine line of co-operative and constructive effort. But just now here is the way they feel:

I am sorry to tell you that the men of our association are so busy as individuals attending to their own business that they have not had any association activities since the meeting in January.

It seems impossible to get any sort of attention to anything of a general nature in connection with the business. The prolonged adhesion by the railroads to the war tariffs has disturbed the channels of trade in our business to an alarming extent and the individuals are endeavoring to cut costs and find new markets to the neglect of all association matters.

I am among those present in this game, too, and find I must try in every imaginable way to get business that I can reach with the present high rates, and all the time try to cut down costs in the face of a constantly rising labor market.

Ready to Support Lime Association

Manufacturers in Various Districts Express Belief That Work Should Continue

PRACTICALLY all of the districts in the Lime Association held meetings during July, preparatory to the general directors' meeting on August 1, at Atlantic City.

The general sentiment was about as expressed at the meeting of District No. 6, in Cleveland, Ohio, where the following resolution was passed:

RESOLVED: That we believe in district organization. We also believe in supporting the Lime Association with a liberal assessment for the maintenance of a national staff sufficiently large to conduct the necessary technical and research work—guiding district field men, preparing and advising upon literature of a technical and promotional nature. Believing as we do, our directors go to the conference, August 1, not only uninstructed but with open minds and a willingness to co-ordinate for the best interests of the lime industry.

At the Atlantic City meeting, in addition to the directors, there will be present representative manufacturers from each district for the purpose of placing before the board the views of others than board members.

In order to stimulate the interest and attendance of such manufacturers, it was decided at the last meeting of board of directors that the transportation of all such members attending this meeting would be paid by the Association.

Col. W. M. Hatch, general manager of the Peerless Portland Cement Company of Union City, and several Detroit capitalists are interested in the reorganization of the New Egyptian Portland Cement Company at Fenton, Mich.

To Put Sand and Gravel Industry on Better Basis

Address before the Meeting of the Ohio Sand and Gravel Producers Association at Cedar Point, Ohio

BY E. GUY SUTTON

THE industry having to do with production of sand and gravel, as a commercial undertaking, is not very old; yet in the ten to fifteen years of its existence, this important industry has grown to enormous proportions, until now it compares favorably in point of output, value of product and the amount of invested capital, along with steel, cement, lumber and other fundamental building materials.

The development of the sand and gravel industry thus far has fallen along natural lines. In the first place Nature has not only pre-arranged the location of its plants, but she has partially prepared the raw material for utilization in construction work. She has blasted fragments from solid rock formations, crushed them to workable size, eliminated the softer materials and has conveyed and unloaded the product of her agencies, wonderfully well graded as to size and proportions, at points where otherwise aggregates for present day methods of construction would be difficult and expensive to secure.

Nature had done so much for the prospective producer, that when he entered the sand and gravel business, he continued, it seems, as a sort of a divine right to permit this kind mistress to minister to his needs without much attention on his part, for he found that sand and gravel are naturally adapted to certain uses. These aggregates, when combined in concrete, show remarkably good results, even when poorly graded and improperly mixed with cement. Gravel when employed as a surfacing material, makes an excellent highway, though carelessly prepared and placed. Sand is considered essential for brick and plaster work, for increasing the tractive power of steam locomotives and motor engines and for finishing castings, and for many other practical purposes—without any effort on the part of the producer to demonstrate its merit for such uses.

In comparison with the production of other aggregates, the operation of a sand and gravel plant seems simple and inexpensive, so that the prevailing practice of the new producer, until recently, was to base his selling prices largely on the misrepresentations of the purchaser and on false assumptions as to cost.

While the producer realized, no doubt, at the beginning of his operations that the question of freight rates and transportation facilities were important elements to be considered in connection with the sale of sand and gravel, yet it was quite natural for him to conclude that the railroad officials, as a matter of business expediency, would see to it that competitive rates and adequate facilities were provided for producers on their respective lines for all time to come.

It would be interesting, perhaps, to dwell further on the evolution of the sand and gravel industry including the periods of experimentation which apparently each industry must pass through, but enough has been related to show you that the producers of these materials have been following the line of least resistance and that because the path was so smooth and the obstacles to progress were so few, business forethought did not develop rapidly. As a consequence, the industry has drifted

into a choppy sea and the clouds on the horizon portend rough sailing.

Without undue alarm let us consider some of the conditions that have come to exist as a result of the seeming apathy of the sand and gravel producers:

1. Crushed stone, a purely manufactured aggregate has been arbitrarily accepted by highway engineers and architects as a standard for gradation of gravel—an essentially differen. product.

2. As a corallary to the foregoing, specifications for gravel concrete have been made to conform to those adopted years ago for concrete made of crushed stone, though the aggregates are vastly different in character as to voids, shape of the particles and inherent qualities.

3. No new types of roads, wherein sand and gravel enter into their construction, have been developed within the industry, while the producers of competing materials have been especially active in this respect.

4. No attempt has been made to create a demand for sand and gravel, other than already established by allied and competing industries.

5. It has been taken for granted that gravel and sand concrete has the highest fire resisting qualities, which is true; but, no doubt, you have read recently that assertions are being made to the contrary.

6. Cost accounting with sand and gravel producers, if considered at all, has been looked upon, until recently, at least, as a customary business practice, having no relation to selling prices. The money that has been lost in the business is testimony of the fallacy of such a view.

7. Our system of freight rates is chaotic while under normal conditions there are not enough open-top cars in existence to handle adequately the movement of coal.

8. We pay a higher rate of liability insurance than industries of far greater hazard.

Thus I might proceed to tell you wherein we have failed in handling our own affairs, but I prefer to outline to you briefly the plans which the National Association are making for the purpose of correcting some of the errors of the past and for preparing to meet the everchanging conditions of the present and the anticipated readjustments of the future.

In the first place, I desire to submit to you our proposed scheme of organization. It should be the chief purpose of any trade association to reach and benefit the individual producer, who in turn in order to secure the best results must be in intimate touch with the producers operating in his particular territory, thus forming natural competitive groups that go to make up state associations. Now it is further recognized that there are certain districts composed of a varying number of states, or parts of states where the character of the deposits, the conditions of operation and transportation, and the problems in general affecting the industry, are similar.

The plan, therefore, will be to build up a National Association, starting with the smaller unit, as follows:

Individual Producers.

Competitive Groups within States.

State Associations.

Regional Divisions (8 or 10 in number.)

National Association.

By having an organization of this kind, it is apparent without further discussion that the activities of the National Association can be correlated and interwoven with the work of the smaller units, so as to prove most effective and, in the long run, least expensive.

There are many matters of common interest to the producers within a state which can be best handled by the combiantion of the competitive groups comprising the state associations.

Similarly, there are questions and problems of greater magnitude and of vital concern to all producers throughout the United States that can be given attention most effectively and economically by the National Association, some of which are as follows:

1. Transportation.
2. Extension of the use of sand and gravel.
3. Co-operation with government agencies.
4. Co-operation with other National Associations.
5. Industrial Relations.
6. Gathering Statistics Relative to the Industry.
7. Legislation Affecting the Industry.
8. Cost Accounting.
9. Insurance.
10. Publicity.

The foregoing are merely suggestions of what may be undertaken by the National Association. But in my opinion the wisdom of being prepared to meet by a united effort the unforeseen conditions that will constantly be presented during the transition period of our national life; that is, the time of changing from the old to the new order of things brought about by the war, is of greater importance than special activities for which definite plans may be laid.

Then, too, the tendency is toward closer relationship in all lines of business. The brotherhood of men engaged in like pursuits is not only in keeping with the spirit of the times as exemplified by the proposed League of Nations, but it is furthermore the part of good judgment as a business proposition. The manufacturers from whom you make your purchases, the engineers who write the specifications for construction work for which you sell your material, the contractors who use your materials; the labor you employ, the owners, security holders and officials of the railroads that transport your products, the insurance companies that write your insurance, and I might continue indefinitely—all are nationally organized.

In the face of such a net work of organized industries, is it not plain that the sand and gravel producers must unite for the development and protection of their interests?

Then in addition to the trade associations with which we must deal and in many cases co-operate, there are, as previously mentioned, a number of organizations composed of allied industries, the representation being principally through national associations. Whatever we may think as to the desirability of such combinations of interests yet since they exist, can we afford as sand and gravel producers to stand aloof and have no part in determining policies that may vitally affect our interests?

In conclusion, I wish to say that the National Association has every reason to exist and exert its influence. It has a mission and a field that is only limited by the amount of assistance it receives, both financially and morally, from the producers which it represents.

Let There Be Light!

HOWEVER the farmers may feel about it, the producers of pit and quarry products have no quarrel with the president for vetoing the proposal to kill the daylight saving law.

One time is just as good as another for operating a plant; and the long evenings furnish the best kind of an opportunity to make repairs when any such are needed, or to put on a new belt, or any work of that kind.

But under normal conditions the evening is appreciated by the plant worker as a prime opportunity to follow his own pursuits without the imminence of darkness settling down upon the world as soon as supper is over.

Chicago S.&G. Producers Organize

AFTER several months of preliminary work, the sand and gravel producers of Chicago have just been brought together in an organization.

This organization is known as the Chicago Sand and Gravel Producers' Association, and represents 100 per cent of the production in the Chicago territory.

The declaration of purposes of the new organization is as follows:

1. To establish and maintain cordial personal relations among the members; to encourage the use of sand and gravel, and to promote in every practicable way the general welfare of the industry.

2. To standardize as far as possible the accounting systems used by the members, and to furnish each member the benefit of any discoveries that may lead to the reduction of costs of production, loading, etc.

3. To harmonize conflicting interests of producers and insure true co-operation among the members; to learn the needs of the Industry at large, as well as of individual members, and to bring out in the open, by free and frank discussions, all elements of cost entering into the production and marketing of sand and gravel.

4. To co-operate with customers, transportation companies, and State, County, Township and Municipal engineers, to the end that the quality of materials produced and the service performed may be highly standardized, that fair and equitable freight rates may be established and that every practicable effort may be made to avoid delays to public work because of unforseen circumstances that may come about in connection with the furnishing of materials.

5. To compile and distribute for the benefit of members, such statistical information as may be required to have them reliably informed at all times in regard to conditions affecting the Industry.

6. To strive constantly to improve conditions in the present markets served by the members and to impress upon common carriers the necessity for a wider range of freight rates, with a view to opening up new markets."

The basis of the organization is somewhat peculiar, in that it has no president or vice-president, but is controlled by an executive board composed of four members. These four members are to be elected by the membership and to rotate in office, one to be elected at each alternate monthly meeting of the members.

The member of the board serving the last two months of his term is to be chairman of the board for that period.

The organization will have a salaried secretary who will look after its business interests under authority of the executive board.

It is expected that each member will furnish to the secretary each day a list of all new contracts as made, also statement of number of cars shipped to each point of destination, the name of the consignee, class of customer, gross price f. o. b. plant, and the number of cars of each grade on track unsold at close of day. Members will also make monthly reports giving such data relative to cost of production and distribution as may be prescribed from time to time.

The executive committee as chosen at the organization consists of the following:

R. P. Duffy, Richardson Sand Company.

Geo. P. Longwell, Consumers Company.

A. Y. Reed, A. Y. Reed Gravel Company.

F. E. Lane, Janesville Sand & Gravel Company.

Ben Stone, business director of the Illinois Sand and Gravel Producers Association, will act as secretary and will open offices in Chicago within a few days. It was through the energetic work done by Mr. Stone that this organization was formed and he deserves much credit for being able to bring these men together.

Louisiana Wants Rates Continued

Has Road Contracts Amounting to $10,000,000 Which Will Run Over Into Next Year

WYLIE M. BARROW, assistant attorney-general of Louisiana, has been in Washington to see whether he could get the Railroad Administration to modify an order stipulating that rates on gravel in Louisiana shall remain in effect only until January 1, 1920, when the railroads are to be returned to their owners. Mr. Barrow takes the position that the rates referred to should be on the same basis as other rates and that they should remain in effect after federal control until changed according to law.

"The Railroad Administration does not take similar action in regard to other rates," said Mr. Barrow, "but as to the gravel rates it says that the hands of the carriers should not be tied after the roads are returned to their owners and that, therefore, the order should not be effective after January 1."

Mr. Barrow saw Director Thelen, of the Public Service Division, and the director said that the matter would be referred to the New Orleans Western District Traffic Committee for hearing.

"We have $10,000,000 involved in road contracts in Louisiana this year," Mr. Barrow said, "and it is very essential that we get a basis of rates established so our contracts won't be disturbed. The cost of gravel and the cost of freight are included in the estimates in his road improvement work, and the contractors should have the assurance that there will not be a sudden change in rates when the roads are returned to their owners. It is difficult to understand how the Railroad Administration makes the exception it does in the case of these gravel rates. It is not saying anything about other rates standing only until January 1."

Railroad Recommends Lime for the Soil

Norfolk & Western Encourages Its Use Along Lines of That Company

THE Norfolk & Western Railroad is encouraging the use of agricultural lime along its road and is issuing some interesting literature on the subject.

The application of lime on most lands and for most crops is recommended to increase the yield and improve the quality.

"Liming the soil has been widely tested and approved by experiment stations and agricultural colleges," says a statement sent out along its lines, and seventeen points are given, as follows:

1. Lime corrects the acidity of the soil.
2. Lime improves the texture of soils and makes them more tillable.
3. Lime decomposes potash compounds and makes them more readily available.
4. Lime assists in the conversion of organic matter into available humus.
5. Lime aids the desirable fermentation processes.
6. Lime forms compounds with various chemicals necessary to plant growth and prevents their loss by leaching or filtering especially in sandy soil.
7. Lime makes sandy soils more cohesive and retentive moisture.
8. Lime makes clay soils more porous and granular.
9. Lime promotes the nitrification of soil through the colonies of bacteria on leguminous plants.
10. Lime provides a favorable condition for beneficial action of soil bacteria.
11. Lime produces the sanitary conditions that prevent the growth of injurious bacteria.

12. Lime removes and overcomes the accumulation of poisons that are formed by decay of humus and excretions from plant roots.

13. Lime is a plant food and is necessary to the growth of plants.

14. Lime releases and makes stored up plant food usable.

15. Lime assists in restoring land to its high yielding power and original productiveness.

16. Lime is a corrector, a dissolver, a decomposer, a liberator of certain parts of animal, vegetable and mineral substances contained in the soil, and it is a fertility maintainer.

17. Lime insures increased production, more wealth and a more permanent agriculture.

Secretaries Discuss Their Problems

Meeting in Chicago Takes Up Some of the Lines of Work to Be Prosecuted

AN INFORMAL conference of secretaries of state sand and gravel associations was held in Chicago July 23 with E. Guy Sutton, secretary of the National Association.

The general purpose of the conference was to discuss ways and means by which the state associations could work most effectively, both individually and in co-operation with the National.

One important topic of discussion was that of the gradation of materials, especially for concrete work, with the purpose in view of leading up to uniform specifications.

R. C. Yeoman, who is working with the Indiana and National Associations as engineering expert, was present and outlined a series of tests which the National Association is conducting at Purdue University to serve as a basis for the development of specifications for gravel concrete.

In this connection it was recommended by the conference that each secretary endeavor to have his state association appoint a committee on uniform gradation.

Another recommendation which was made, along an entirely different line but perhaps none the less important, was that each secretary endeavor to get under way in his state the development of social relationships among the producers as a basis for the best type of business relationships. This was done in recognition of the principle which has been pointed out so many times—that the other fellow is usually a pretty good fellow to work with, if you will only take pains to get acquainted with him.

The secretaries present offered to enlist the support of their states in increasing the membership of the National Association.

It was recommended that the National determine upon a definite railway legislative policy; that the consideration of this by the executive committee was strongly urged, and also that the National Association be asked to use its influence toward having the 10-cent freight reduction extended to all classes of construction work, whether public or private, in order to encourage the expenditure of private funds and to increase the amount of public work other than highways.

F. A. Jones, who resigned the management of operations of the Kelley Island Lime & Transport Co., Cleveland, Ohio, to assume that of the limestone department of the Columbia Chemical Co., Zanesville, O., has had wide experience in the stone industry and was at one time engineer of the United States Gypsum Company. He is a member of the Lime Association and has done some very valuable committee work. Mr. Jones will be the engineer in charge of design and construction as well as of operation, of the new stone plant the Columbia Chemical Company is erecting at Zanesville, also of the mammoth lime plant which they will erect there eventually.

James A. Hart, Head of Gravel Company, Dies

Active in Baseball for Many Years and Once President Chicago Cubs

JAMES A. HART, president of, and a large stockholder in, the Chicago Gravel Company, and who had other substantial interests, died on July 18, at his Chicago home.

Mr. Hart was probably one of the best informed baseball men in the country, having been actively associated with the game for twenty-five years. He was closely connected with the National League for sixteen years, and for fourteen years was president of the Chicago Cubs, retiring from that organization in 1905 when it was sold to C. W. Murphy.

Many of the important rules of baseball were originated by Mr. Hart, the foul strike rule being his final effort in this direction. He was largely responsible for many other rules now deemed indispensable.

In the spring of 1900 Mr. Hart went to Scotland and England and introduced baseball into those countries.

He was born in Girard, Pa., 64 years ago, and is survived by his widow, a son and a daughter.

J. J. Douglas and associates have incorporated the Cypress Valley Limestone Company, Florence, Ala., at $5,000 to engage in the business of crushing limestone and handling fertilizers. Oil City Silica Sand Co., of Oil City, Pa., capital $300,000, has been incorporated by George C. Magee, Elizabeth Magee, and Albert W. Kaufman, all of Oil City. The new company will quarry and mine sand, sandstone, rock, etc.

The Newaygo Portland Cement Company is considering the purchase of the hydrating plant formerly operated near Charlevois, Mich., and will remodel the same. It is planned to produce 1,000 barrels a day.

Stone Company May Make Cement

Bessemer Concern at Youngstown Has Increased Capital for This Purpose

A recent dispatch from Youngstown, Ohio, states:

Rumored developments in connection with the Bessemer Limestone Company with extensive quarries at Bessemer, Pa., came to a head in the incorporation of the Bessemer Limestone and Cement Company with a capital of $3,000,000, by John Tod and others connected with the Bessemer Limestone Company.

The incorporation of the new company at this time with the word "cement" in the title is declared to mean that the corporation will enter the cement manufacturing field on a large scale. Officers of the Bessemer Limestone Company have admitted that such a development has been in contemplation but that they are not prepared to give out details.

Lying in the heart of the Lawrence county limestone region the Bessemer Limestone Company has been long engaged in supplying limestone to iron and steel plants for fluxing purposes and was engaged, at one time, in the production of limestone blocks for construction purposes. The concern is one of the best known in its line in Eastern Ohio and Western Pennsylvania.

At the recent annual meeting of the company officers, directors and stockholders residing in this city made a thorough inspection of the property. Shortly after this gathering it was stated that extensive developments might be expected within a short time.

Officers of the Bessemer Limestone Company are John Tod, president; R. C. Steese, vice-president; F. R. Kanengeiser, vice-president and general manager; J. R. Rowland, treasurer, and G. G. Treat, secretary. The main offices occupy a suite on the seventh floor of the Stambaugh building.

The Kokomo Stone Company, Kokomo, Ind., have been awarded the county contract for crushed stone to be delivered and dumped at $1.39 per ton.

Director Fippin on Job

Invites Questions, Problems and Suggestions from the Lime Producers

MR. E. O. FIPPIN, recently appointed director of the Agricultural Bureau of the Lime Association, is already on the job and has developed a number of new ideas for the fulfillment of the functions of the Association which will interest all lime manufacturers.

"In the first place," he says, "We shall aim to approach all problems in the spirit of conference and co-operation. On the producers' side we welcome all suggestions as to the nature of the problems in their territory and the ways in which they might be approached. The district conferences in some parts of the country that are being arranged through the board of directors will give opportunity to discuss such matters somewhat in detail as they appear at present.

"We trust that at all times producers will feel free to present their problems, questions, and suggestions touching the agricultural field." Mr. Fippin continued. "To all of these we will endeavor to give careful consideration. We shall have occasion to ask from time to time for data based on the experience and observations of various producers. These data we will endeavor to combine with the data that we will also secure from the various public institutions and organizations; and out of the total will come the facts and principles indicating the best course for all concerned, by which we will try to be guided.

"There are many terms, usages and effects touching lime materials, especially in their application to the soil, where the viewpoint and, therefore, the understanding, throughout the producing field and the agricultural public is not the same. This is an outgrowth of the newness of the field and its rapid extension into the domain of agriculture. To fill up the gaps in dependable information and to secure a uniform and satisfactory usage of terms requires patience, toleration and much investigation and conference, to the end that we may be agreed that the final conclusion and practices are the best available. We shall act with this fact in mind.

"What the fertilizer industry is so well doing in this direction for its advancement in a field closely allied in character and problems to our field we shall aim to do for the use of liming materials in agriculture."

Mr. Fippin invites questions, problems and suggestions, and, and says: "We do not set ourselves up as a universal cyclopedia of information on agriculture, but we will try to be directly useful in our own field and helpful beyond its bounds where we can give assistance, by making this office a clearing house, both within the industry and between it and the agricultural world, to the end that farmers may use lime materials in a larger way to their profit. The industry will naturally benefit by this larger present business and by sound teaching and good field results larger future business will be assured."

The Brown-Gordon Gravel Distributing Company has been formed in Lansing, Mich., by Claude J. Gordon and W. L. Brown, and has taken over the Burwell gravel pits, south of the city, and established offices in the Young Bros.' Block. The new company has taken the contract to deliver 20,000 yards of gravel for the new state house addition as well as for the Olds Motor Works which is erecting several large factories. The company has motorized its equipment, having five motor trucks in operation at the present time, and more to be added shortly.

The Raeder Sand & Gravel Co., of Akron, Ohio, has been incorporated, with a capitalization of $25,000.

Airtight Lime Container Gains Favor

Much Interest Developing as Request of Demonstration at Pittsburgh Convention

FOLLOWING the convention of the Lime Association at Pittsburgh, it is reported that at least one important lime manufacturer has taken steps to adopt the airtight steel container for shipping out his product.

It is felt among all the progressive manufacturers that this is a step in the right direction and one which must be generally adopted before very long.

The Lime Association has been receiving many inquiries requesting information as to where lime so packed could be purchased.

It is expected that a number of companies will be reporting their adoption of this type of package in the near future.

Superior Raw Material

Lieutenant-Colonel Alfred H. White of the Ordnance Bureau is the man who was depended on in all war preparations to know more about extracting nitrates from the air than any one else.

Colonel White says that in locating air nitrate plants his department had to listen to the arguments of many chambers of commerce as to the special advantages of their particular towns for this industry.

One New York town, determined to leave no stone unturned in building up its fabric of argument, stated that its committee was reliably informed that the air of that particular part of the country was especially suitable for the production of nitrates.

On the other hand, objections to such a plant were made in one locality, on the ground that the extraction of so much nitrogen from the air made it very unhealthy for the inhabitants.

Instructions and Bonuses

Instead of allowing employees to operate machines and do their various work according to their own discretion and knowledge, written instructions are issued covering each man's position. These can be given directly to the men or can be posted at the various machines or positions in the quarry and mill. In this connection safety first must be considered as well as economical operation.

This must be considered under two headings, *Wages* and *Bonuses*. There must be a basis of wages for all the men, fair to them and to their employer.

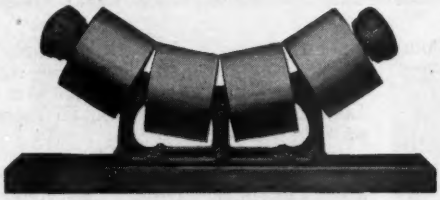
By instructions and assistance each man must be made, if possible, an earner of a daily bonus. Thus he is rewarded liberally and the quarryman is netted an additional profit.

The Mississippi Sand Company, Alton, Ill., has increased its capital stock from $75,000 to $250,000 and will change its name to the Mississippi Lime and Material Company. The stock held by President McKenna, J. H. Booth and others has been acquired by Joseph Aldous, secretary and treasurer, and H. B. Mathews. No president of the company has as yet been elected, Mr. Aldous continuing as secretary-treasurer and Mr. Mathews as vice-president.

The Staunton Lime Products Co., Staunton, Va., recently incorporated, has completed its organization and announces that a lime grinder and hydrater will be installed and fifteen acres of lime deposits developed. To start, the plant will have an output of ten tons of burn lime daily.

Recent experiments at the University of Illinois show that 1-32 of an inch of scale in boiler tubes will reduce efficiency by 9 per cent, while 1/9 inch will reduce it 16 per cent.

CALDWELL CONVEYORS



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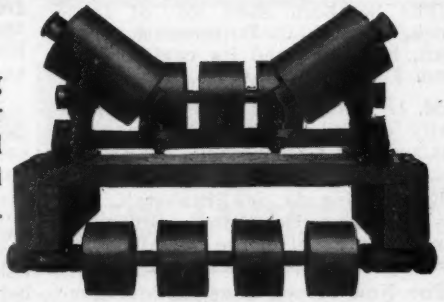
Simple in design, economical of power, they give satisfaction. Different styles to suit your requirements.

A rough sketch showing conditions to be met at your plant, with capacity desired and power available, will bring our recommendations.



APRON OR PAN CONVEYORS

Flights or pans made of steel or cast iron, fitted to steel bushed self-oiling roller chain — complete with drives.

SCREW CONVEYORS

Steel "HELICOID" or Sectional flight screw conveyor for washing plants. We also make cast iron Screw Conveyors.

See Catalogue No. 38 for complete line of

Elevating, Conveying and Power Transmitting Machinery

H. W. CALDWELL & SON COMPANY
CHICAGO
Western Avenue, 17th and 18th Streets

NEWS FROM THE FIELD

The Rich Gravel & Excavating Company, of Knightstown, Ind., has filed final certificate of dissolution.

Judge Craig of the Galesburg (Ill.) Sand & Gravel Company, was recently elected a member of the new State Tax Commission.

The Southern Sand Co., of Little Rock, Ark., A. C. Butterworth, president, has increased its capital stock from $15,000 to $50,000.

M. L. Horty, J. D. Frock and M. C. Kelly of Wilmington, Del., have organized the Manor Sand and Gravel Co., with capital of $50,000.

E. O. Edwards, of Pittsburgh, Pa., has succeeded Howard H. Brown as purchasing agent of the Castalia Portland Cement Co., of Castalia, Ohio.

The New Jersey Construction Company, chartered to do business in Hackensack, N. J., will deal in limestone. Capitalized at $125,000. A. C. Hart, Agent.

John C. Butterfield, William Tydeman and R. Ethel Bowers, all of Ottawa, Ill., have incorporated the Acme Silica Co., of Ottawa, with a capital stock of $35,000.

Jasper R. Tate, president of the J. R. Tate Sand Company, West Middlesex, Pa., was killed at the plant recently, when an immense sand pile caved in and buried him.

The Winona Sand, Gravel & Paving Company, Winona, Minn., is now under the general management of Stephen O'Dea. He purchased the interests of W. J. Connors in the concern.

The total quantity of crude gypsum mined in the United States in 1918 was 2,056,462 short tons, a decrease of 24 per cent from the output of 1917, according to the U. S. Geological Survey.

The New Egyptian Portland Cement Company, at Fenton, Mich., is to be reorganized and the factory rebuilt and operated. Col. W. M. Hatch, general manager, of the Peerless Portland Cement Company, of Union City, is said to be interested, along with some Detroit capitalists.

The Walter A. Zelnicker Supply Co. of St. Louis has added 2,000 square feet to its present office space at 325 Locust St., St. Louis, Mo., an increase of 33⅓ per cent.

The Greenville Gravel Company, Mechanicsburg, Ohio, has changed from an eleven-hour schedule to the ten-hour one. Since January the plant has shipped 8,000 cars of material, aggregating 450,000 tons.

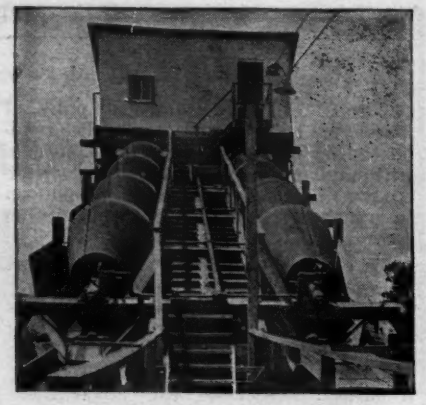
The Mount Solon Lime Co., of Mt. Solon, Augusta County, Va., with a capital stock of $50,000, has been organized to establish a lime plant. C. C. Clinedinst is president and A. M. Horn, secretary, both of Mt. Solon.

The Windber Silica Sand Co., established during the past year at Windber, Pa., has its new plant in full operation, about twenty-five men being employed. The plant is producing about 150 tons of washed sand per day. Plans are under way for the construction of a number of up-to-date bungalows for the employes. The plant and surroundings will be made a model industrial community.

W. C. Tyrrell, A. L. Luick and John Berg have purchased the Wilbur farm, north of Belmond, Ia., and will form a company for the purpose of commercializing the immense quantities of sand and gravel contained in the land. They will start off with a contract for 8,000 loads of gravel. It is planned to run a spur from the near-by railroad to the pit and install the necessary machinery for loading purposes.

The Advance Pump & Compressor Co., of Battle Creek, Mich., is spending approximately $75,000 in enlarging and otherwise improving its plant. Ground has been broken for a foundry of steel and brick construction, and there will also be a new machine shop which will be connected with the foundry by an overhead bridge. A new power house is also included in the plans, which will increase the boiler and electrical capacity of the plant. The $75,000 does not include the new machinery to be added, much of which has already been purchased.

Complete Link-Belt Sand and Gravel Washing Plant



Dull Inclined Conical Screens

LINK-BELT

Sand and Gravel Plants

We design, equip and supervise the construction of complete sand and gravel washing plants or alterations to present plants.

The fact that over seventy-five percent of such plants in America are Link-Belt and Dull designed is proof of the high efficiency and successful operation of our plants.

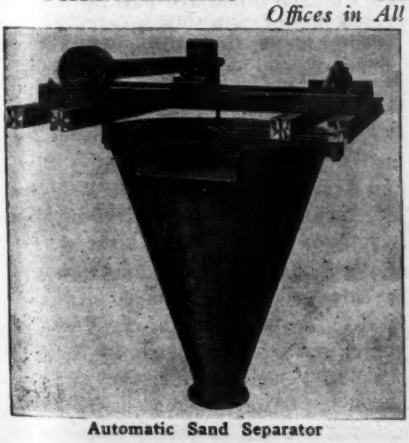
Our engineers are specialists in this field. Our equipment is of the highest grade and represents positively the last word in design and efficiency.

Write for our Sand & Gravel Plant Book No. 17
Let our engineers help you.

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

Offices in All Principal Cities



Automatic Sand Separator

Cable Way Excavator Bucket

Back in Peace Work

The S. G. Taylor Chain Company, of Chicago, has now completely readjusted its manufacturing to peace conditions, and is supplying its well-known brands of chain for use on steam shovels and other construction operations.

Like other partiotic concerns, this company placed its entire facilities at the command of the government during the war, with the result that it can look back with pride to the fact that its product helped to equip a large number of the government ships. It was glad to be able to furnish chain which would meet the very exacting requirements of government work, giving it renewed assurance of the excellent service it is giving to steam shovel operators and other men in construction work.

In addressing the trade relative to its return to a peace basis, the company makes this statement:

"We have manufactured chain continuously since 1873. During our forty-six years' business experience we have adhered strictly to the principle of making Quality the first importance. The reputation we have established speaks for itself.

"The service a chain gives you is the one test on which you can base your decision as to what chain to use. In buying Taylor-Mesaba you have abundant assurance that you are making the best possible choice.

"It is forged from the best selection of high-grade iron chosen by us after exhaustive tests.

"It is strictly hand made by expert workmen, every one of whom has been in our employ for years. None but experienced men are allowed to make Taylor-Mesaba.

"Its durability in service is vouched for by a host of satisfied customers who have thoroughly tested it out in every class of service. It is in use from the Iron Ranges of Minnesota to the Phosphate beds of Florida, from the railroads of Siberia to those of the Rocky Mountain States of America. It was largely used by the Isthmian Canal Commission in the work on the Panama Canal."

The K-B Pulverizer Company, Inc., have removed their office from 70 Worth street, to 92 Lafayette street, New York City.

Chicago Now Main Western Branch

Mr. Phillips, who has just taken charge of the Chicago office of the Good Roads Machinery Company, in addition to having operated in every department of the factory, has also been sent abroad in the interest of the company on two different occasions to locate and establish agencies.

In recent years Mr. Phillips has served as manager of the Boston office, which covers all the New England States, being transferred January 1st of this year to the Fort Wayne branch office as manager, which office handles and controls everything west and south of Indiana, or a total of twenty-nine states.

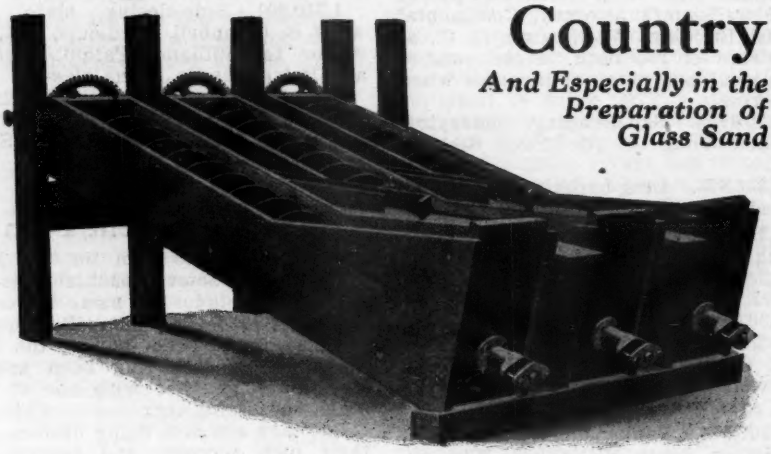
July 1st the Fort Wayne office was transferred to Chicago, 1203 Tower Building. From now on all territory formerly handled by the Fort Wayne office will be looked after by the Chicago office, which will be the main Western branch, although for the time being the Fort Wayne office will be continued in a small way.

The manager and his associates of the Chicago office are putting into effect a lot of new ideas carrying out mature plans that will spell greater efficiency and service to the trade.

Bichler Bros., of Groos (Wells P. O.) have taken over the sand and gravel plant of the Escanaba Stone and Gravel Co., owned by A. R. Moore, of Escanaba, Mich. Bichler Bros. have been furnishing a large portion of the stone and gravel for road work in this section of the country, but with the acquirement of the Escanaba plant, and the expansion in the business they contemplate, they will become one of the biggest producers of crushed stone and gravel in the state of Michigan.

Used in Some of the Largest Quarries in the Country

And Especially in the Preparation of Glass Sand



LEWISTOWN
Sand Washers

These are reasonably priced, well built, compact outfits, which can be easily and quickly installed. They are simple in construction and efficient in operation. Extensively used in the manufacture of glass sand which is so much needed today in the making of optical lenses for field glasses, telescopes, etc., required by the Government.

If you are not acquainted with Lewistown equipment and service, it will pay you to look into it.

We are in position to assist you solve your problem of whatever nature, if it pertains to crushing, grinding, screening, washing, drying and conveying, as we manufacture a full line of this machinery and equipment. Drop us a line stating what you desire information on.

Lewistown Fdy. & Machine Co.

LEWISTOWN, PENN.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,306,758. Self-dumping conveying-bucket. John F. Godfrey, Elkhart, Ind.

1,306,873. Drag-bucket. William C. Wood, San Francisco, Cal.

1,307,428. Dump-car. Samson D. Wright, Cleveland, Ohio.

1,307,448. Mechanical shovel. Fred Lerch, Virginia, Minn.

1,307,545. Outrigger operating and locking device for locomotive-cranes and the like. Walter Ferris, South Milwaukee, Wis., assignor to Bucyrus Co., same place.

1,307,574. Bank-spud. Svante R. W. M. Bager, South Milwaukee, Wis., assignor to Bucyrus Co., same place.

1,307,590. Pile-driver hammer. Peter H. Mackie, Maxwelton, Wash.

1,307,747. Excavator-bucket. Eugene J. Moynohan, San Francisco, Cal.

1,307,951. Ball-mill. John R. Ball, Durango, Colo.

1,307,952. Ball-mill liner. John R. Ball, Durango, Colo.

1,308,150. Excavating-bucket. William M. Venable, Pittsburgh, Pa., assignor to Blaw Steel Construction Co.

1,308,639. Mine-working machine. Norton A. Newdick, Columbus, Ohio, assignor to James E. Jones, Switchback, W. Va.

1,308,843. Driving-chain for mining-machines. Charles E. Davis, Chicago, Ill., assignor to Goodman Mfg. Co., same place.

1,309,054. Excavator. John H. Albrecht, Madison, Wis., assignor to T. L. Smith Co., Milwaukee, Wis.

1,309,104. Crushing-machine. Eugene L. Sanborn, Milwaukee, Wis., assignor to Smith Engineering Co., same place.

1,309,477. Manually-operated coal-mining machine. Ed Jackson, Thurber, Tex.

1,309,807. Jaw-crusher. Ray C. Newhouse, Milwaukee, Wis., assignor to Allis-Chalmers Mfg. Co., same place.

1,309,827. Roll-crusher. Paul C. Van Zandt, Chicago, Ill., assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis.

1,309,846. Excavating-bucket. Robert M. Fotheringham, Buffalo, N. Y.

1,310,001. Side-closing plate. Edward B. Campbell, St. Louis, Mo., assignor to Williams Patent Crusher and Pulverizer Co., same place.

1,310,248. Stoneworking-machine. Thomas Officer and Henry H. Mercer, Claremont, N. H., assignors to Sullivan Machinery Co., same place.

New Equipment Firm

A new Chicago firm for the handling of contractors' machinery is doing business under the name of Cooley Brothers, 1135 Old Colony Building.

These men are not new in the business, however, having been associated for some time with one of the other successful concerns in Chicago.

But they are now doing business on their own account, and carrying a line of power plant equipment, crushers, elevators, buckets, screens, steam shovels, pumps, etc.

"Bull-Dog" Catalogue

The Traylor Engineering and Manufacturing Company, Allentown, Pa., has just issued a new catalog on the Traylor Bull-Dog jaw crushers. This catalog shows the various parts of the crushers in very enlightening detail, especially the Bull-Dog toggle bearing and end, which needs no lubrication and is so nearly frictionless that it absorbs no power. On this account, also, it has long life and requires little or no attention.

The catalog also includes the Traylor revolving stone screen as well as shaking screens, hoists, etc.

L. L. Gerstenberger, formerly sales manager of the Main Belting Company at Philadelphia, has recently been made assistant general sales manager of the Imperial Belting Company. He will be located at their general offices, Chicago. It is also announced that Charles G. Sherman, formerly manager of the Atlanta branch of the Main Belting Company, is now connected with the Imperial Belting Company, Chicago, and will make their general offices his headquarters.

Combustion and Flue Gas Analysis

(*Continued from last issue*)

Draft regulation is one of the most important factors in maintaining combustion efficiency. (See figures 3 and 4.)

A great deal of misunderstanding exists concerning draft gauges, and much misinformation regarding their application and use is current.

There is some draft that will burn a particular fuel with the best efficiency in each particular plant, but you can no more look at a furnace and tell the draft that is being applied t oit than you can look at a boiler and tell the pressure within it;

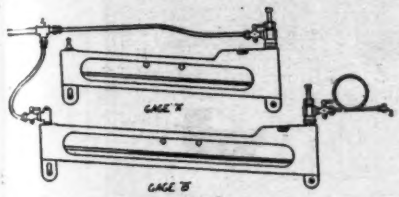


FIG. 3.

furthermore, drafts change with atmospheric pressure, with shifting winds, and other meterological conditions.

As a rule the boiler nearest the stack gets less than its share, depending on the flue connections. Many serious cases of draft troubles could be cured and fuel saved by adjusting the individual dampers to equalize the draft among the boilers. After equalizing, the drafts of all may be changed at once by using the main breechings damper.

You should use the draft that will meet the load conditions and produce the best percentage of CO_2 without CO and without fusing the ash. There is practically no exception to this rule.

As has been stated already, though, the maximum practical furnace temperature depends largely on the fusing temperature of the ash of the coal used; if ash slag forms under the normal of good furnace practice, the obvious remedy is to change the furnace, the fuel, or both.

The best draft over the fire for hand-fired furnaces burning bituminous coal ranges from 25 to 40 hundredths of an inch of water (the scales of most draft gauges are calibrated in terms of water displacement), but it may be materially more or less, depending on the grate used, the size and ash contents of the fuel, etc. Find out the correct draft for your plant by using the gas analyzer.

It is not necessary, except for purposes of special study, to take the draft at any point except the furnace, but it is essential to have a constant indication of the draft there.

The gauge should be so located that it will be before the eyes of the fireman. An experienced fireman will fire by the draft rather than the steam gauge.

Figure 3 shows a combination of two draft gauges; figure 4 a single one with special connections. Figure 4 is probably the more practical—it will not confuse the fireman.

If desired, the draft through the boiler may be read at any number of points by installing the necessary pipes and cocks. A study of the diagram with attached explanation will make the manner of installing and the method of use apparent.

In installing the draft gauge a point in the furnace wall, in front, should be selected as far above the grates and as near the front of the furnace as possible. Figure 5 shows an approved method of connecting and mounting a draft gauge on a hori-

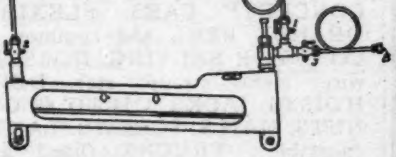


FIG. 4.

zontal return tubular boiler, also an improved method of installing a gas collector.

Draft gauge "A" in the above diagram is connected to show the draft over the fire. Gauge "B" is connected at the last pass of the boiler and shows the draft drop or loss between the last pass and the furnace.

The draft gauge (fig. 4) is normally used to show the draft over the fire,

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In the pit and quarry field particularly, we can furnish promptly, STONE ELEVATORS, SCREENS, DUMP CARS, SCOOP CARS, CONCRETE CARS, FLEXIBLE SPOUTING, CLAM SHELL, ORANGE PEEL and common TIP and TURN-OVER BUCKETS, CONVYOR BELTING, HOSE, LEATHER BELTING, ROPE (hemp, wire, metal strand, etc), DERRICKS, BLOCK AND TACKLE, HOISTS, JACKS, OILED CLOTHING, RUBBER BOOTS, BOLTS, NUTS, NAILS, SCREWS, LANTERNS, CARBIDE FLARE LIGHTS (portable), TRUCKS (hand and wagon), PORTABLE TRACK, TOOLS, ETC., ETC., ETC.

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but it may be used to take any of the readings obtainable in the combination, figure 3. "A" (fig. 4) is connected at the furnace and "B" at the last pass.

(a) To read draft over fire: Open valve 1, close valve 3, and set valve 2 to atmosphere.

(b) To read draft in last pass: Open valve 3, close valve 1, and set valve 2 to atmosphere.

(c) To read draft loss between last pass and furnace: Open valves 2 and 3 and close valve 1.

To interpret the gauge readings, there are a few principles to remember. If the liquid moves toward the zero point of the scale at the left

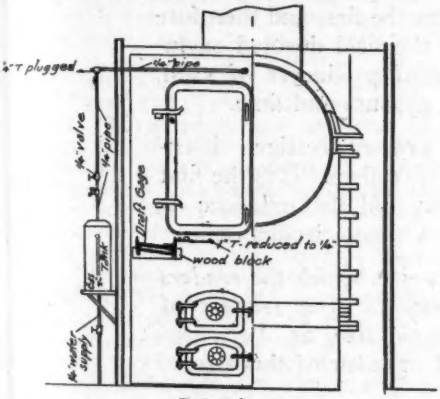


Fig. 3. Front.

the fires need attention; they are burning thin, or holes are forming in them. If the liquid moves in the other direction, the fires are thick and should be burned down or perhaps raked before adding more coal.

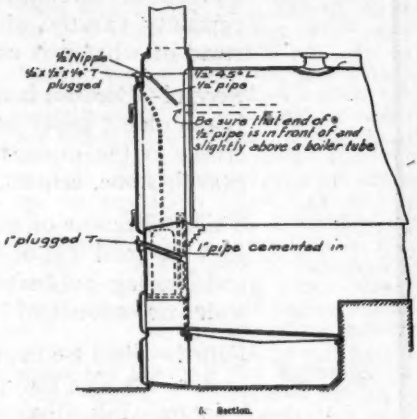
Locate all gauges where the fireman can watch them most readily and place the damper control so that he can observe the draft gauge while setting the damper.

The plant owner should see that the uptake damper can be adjusted easily from the front of the boiler, otherwise the fireman can not be blamed for using the wrong method. He should be made to use the dampers instead of the ash pit doors. Ir he does not, the doors might be removed.

A very important part of the measure that may be found necessary to improve the efficiency of a power plant will be instructing the fireman as to the effects of opening the furnace doors unnecessarily often or of leavin gthem ajar, of leaky boiler settings, of holes or cracks in the fuel bed, of too much or too little draft, etc. Encourage the firemen to ask questions and instruct them largely through your answers to these.

Explain that the gas-analysis apparatus is really an instrument for determining whether or not an excess amount of air (which means more work for him) is flowing over the boiler heating surface. Let him watch while a gas sample is being drawn and then analyzed.

Assuming that the sample shows 4


½" Nipple
½ x ½ x ½" T plugged
½" 45° L
½" pipe
Be sure that end of ½" pipe is in front of and slightly above a boiler tube
1" plugged T
1" pipe cemented in

5. Section.

per cent of CO_2, explain that this means that the furnace is taking at the rate of 517 cubic feet of coal to heat up this unnecessary air and more work to handle this and the needlessly larger quantities of ashes and clinker; all leading to increased fuel and labor costs.

Let us assume that an examination of the fuel bed showed cracks, thin places, and holes, and that after closing these by breaking up the lumps and leveling the fuel, a second sample showed 10 per cent of CO_2, indicating 107 per cent of excess air. We have by simply cutting out four-fifths of the air greatly increased the steam pressure without firing a pound of coal.

Since 1876, 6,937,305 tons of gypsum with a value of £2,538,761 has been produced in England, the highest production for one year having been 285,338 tons in 1913 with a total value of £90,450, or about $452,000. Sixteen per cent of the above total was recovered from quarries, the rest being from mines.

Why Pit and Quarry Carries More Advertising

than any other paper covering the sand, gravel, stone, cement, gypsum and lime industries.

First—Because it is a member of the Audit Bureau of Circulations and one knows to a certainty exactly what the circulation is, instead of what it is claimed to be.

Second—Because it was the first and therefore is the oldest paper in the field devoted exclusively to the interests of producers of sand, gravel, stone, cement, gypsum and lime.

Third—Because of its greater prestige. It enjoys the good will of its readers. It is the first and leading publication and its influence is wider on account of its larger circulation.

Fourth—Because of its size, which the *readers* prefer. It fits the pocket. The *readers* of Printers' Ink, the same size as PIT AND QUARRY, voted 50 to 1 in favor of this size.

Fifth—Because it always serves the reader better, as it gives a reliable news and editorial service in the size and form they want.

Sixth—Because it secures the biggest results for advertisers. It gives them 100% publicity as this one medium covers these allied industries completely.

Advertising rates will be mailed upon application to

PIT and QUARRY

RAND-McNALLY BLDG.,

Chicago

Ask the Producer What Paper He Reads

Our Experience With Power Plants

BY R. SNODDY

Manager Coon River Sand Company, Des Moines, Iowa.

We have been in operation for twelve years in which time we have built seven sand plants and are now engaged in constructing our new No. 8. The first seven were operated on a small river. No. 8 is being built away from the river to operate from a pit.

The first seven plants were designed for steam power. Until the present high cost of coal, steam was the economical power for our condition. Our coal was obtained in carload lots with only a three-mile switching fee as freight. For the first three years we paid from $1.75 to $1.85 per ton, F. O. B. cars our plant, at which time electricity was 3 cents. Five years ago coal was $2.25 with electricity 2½ cents. Three years ago coal was $3 with electricity at 2 cents. From that time till this the electricity has carried a clause for increasing the rate in proportion to the increase in the price of coal which makes it now about 2½ cents for an extensive user as compared to coal at about $4.50.

Up to five years ago coal was the economical power, but now conditions have changed and electricity is the economical power. Seven years ago with coal at $2.10 and electricity at 2½ cents it cost more for coal per carload of sand than it did three years ago with coal at $3. This was because of improvements in our equipment and method of handling sand. In addition to the price of the coal it costs us an average of about $1 per ton to handle the coal. It is first unloaded from the car by locomotive crane and clamshell, after which it is shoveled into wheelbarrows and wheeled down to the river, where it is dropped onto barges which convey it out to the pump boat, where it is shoveled onto the boat, and then the ashes from the boat must be brought back in the same manner, as it would not do to drop them in the water to mix up with the sand.

Three years ago with coal at $3 the cost of the coal and handling it, being a total of $4 per ton, costing us $1.10 per carload of sand. At that time our competitors using electricity were getting by with $1 per car for power. At present prices of coal the cost of power would be approximately $1.50 per car of sand and electricity approximately $1.15 or $1.25 per car.

Our new plant which we are now constructing and which is a great improvement over the old plants will be able to handle the material more economically, so that the power cost will be, as near as can be figured in advance, $1 per car even at the present rate for current.

The steam equipment which we have used in the past, and which we are yet using at our big retail plant, consists of locomotive-type fire-box boilers, center crank engines without governors, all mounted on a scow with centrifugal pump and hoisting engine for handling the nozzle. On the shore, our shaker screens and revolving screens and bucket elevators are driven by oil engines. This plant will no doubt be equipped with electricity next winter while we are closed down.

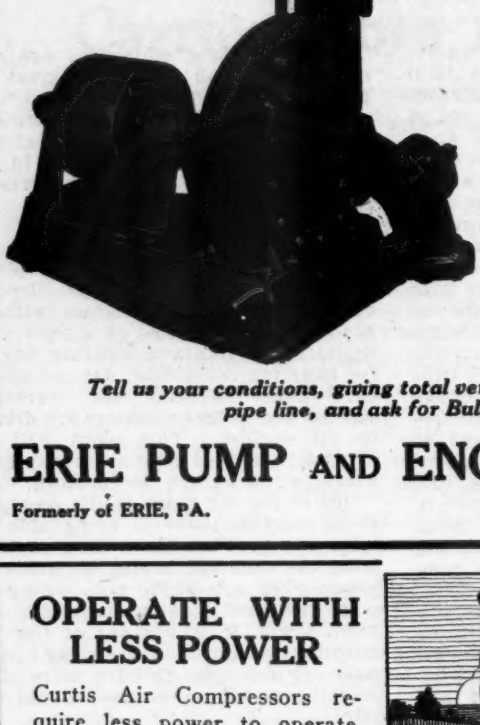
One of the big items in the economy of an electric plant is being able to start quickly when the switch engines bring the cars and having no waste of power when something goes wrong to cause the plant to stop operating. In other words it is because of the intermittant condition of operating which makes it necessary to burn more coal than the actual power used would require.

Save Money by Checking Bills

One member of the Illinois Sand and Gravel Producers Association has recently reported that he was able to secure refund of a considerable amount paid for power as result of careful check of bills as rendered against discount provision in the power company's schedule of rates.

The discounts are important, particularly the special discounts allowed on all bills when the plant is not operated between the hours of 4:00 P. M. and 8:00 P. M. during the months of November, December, January and February.

Like most other industries, during the past year the power companies have employed inexperienced help and a great many errors have no doubt been made on that account. Monthly bills for service should be carefully checked.



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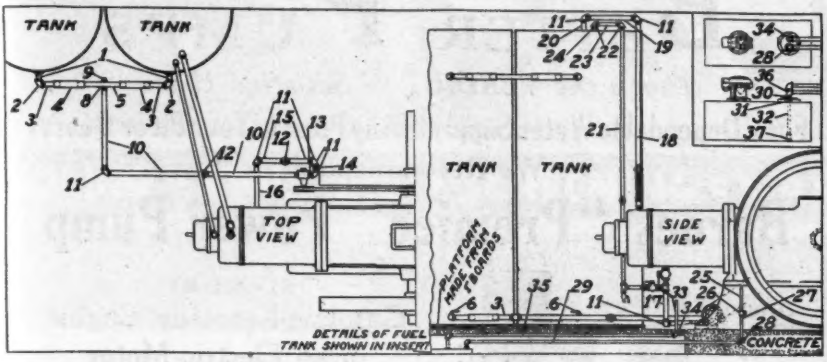

Piping Plan With Engine

A manufacturer of fuel oil engines has simplified the matter of installation for his customers by sending out with the machine a piping plan and list of fittings, and supplying pipes and fittings in proper lengths and sizes ready to install.

The illustration herewith shows such a piping plan. The numbers refer to a list printed below, the plan giving the name and size of each piece.

The installation is further simplified by numbering these pieces in the order in which they are to be used. No cutting or threading of pieces is necessary, and the engine can be installed by inexperienced help in a very short time.

The company operating in this way is the Stover Manufacturing and Engine Company, Freeport, Ill., which has been making the Stover fuel oil engine for the past nine or ten years.

Before the war practically no American glass was sold in Australia. When European imports were cut off, the importation of American glass and some Japanese glass was started. This market developed very rapidly and the indications are that the trade will be retained. It will be several years before Europe will be able to export glass and it seems probable that the American product will become firmly entrenched. A great increase in the Australian trade is predicted for the near future.

The Delaware River Quarry and Construction Company, of Lambertville, N. J., have begun the erection of a new stone crushing plant at Gilboa.

Protection of Industry

The topic of paramount importance and interest in the domestic magnesite industry at the present time is whether the industry is to receive protection—in other words, whether foreign magnesite, chiefly from Austria, is to come in free of duty. The hearing before the Ways and Means Committee of the House of Representatives to obtain the facts in the case developed much information of great interest not only to the magnesite industry, but to those dependent on this important refractory mineral. This hearing centered about a bill introduced by Representative L. H. Hadley of Washington which provided for a tariff of ¾ cent a pound on magnesite crushed or ground; 1¼ cents a pound on calcined, dead-burned, and grain magnesite; and a 25 per cent ad valorem duty on magnesite brick. Heretofore, calcined magnesite and crude magnesite have been imported duty-free, and there has been a 10 per cent ad valorem duty on magnesite brick.

Bradley Books

The Bradley Pulverizer Company has recently issued some new printed matter, the three booklets covering respectively the Improved Griffin Mill, the Bradley Three-Roll Mill, and the Bradley-Hercules Mill. All of these pieces of equipment are well known in the field of cement, gypsum and lime production, but it will be well for manufacturers to have these on file for use in reordering, or in adapting these machines to new conditions. They will be sent free by the Bradley Pulverizer Co., Boston, Mass.

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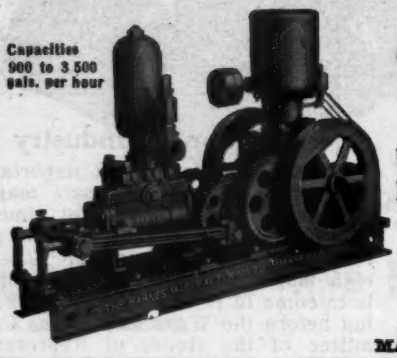

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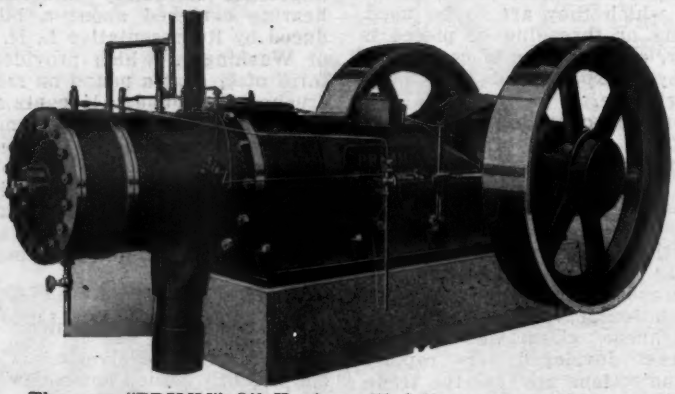

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